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BUREAU OF AGRICULTURAL INTELLIGENCE AND PLANT DISEASES

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PREFACE

The present contents are those of the two first numbers of the Bulletin of the Bureau of Agricultural Intelligence and of Plant Diseases (November and December, 1910) and of the successive numbers of the whole year 1911. These Bulletins contain nearly 3000 abstracts dealing with the various branches of agriculture and allied industries.

The contents are divided into two sections:

Agricultural Intelligence and Plant Diseases, and each of them is subdivided into:

- a) Alphabetical index of subjects;
- b) Alphabetical index of authors.

The reference to the Bulletins is given by the number attached to each abstract, except for the first two Bulletins (November and December 1910) in which the abstracts were not yet numbered; for these the number of the page, printed in italics is given instead.

This volume of Contents has been prepared by the Redacteur Dr. V. de Tivoli.

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The International Institute of Agriculture was established under the International Treaty of June 7th., 1905, which was ratified by 40 Governments. Eleven other Governments have since adhered to the Institute.

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The Institute, confining its operations within an international sphere, shall :

(a) Collect, study, and publish as promptly as possible, statistical, technical, or economic information concerning farming, vegetable and animal products, the commerce in agricultural products, and the prices prevailing in the various markets.

(b) Communicate to parties interested, also as promptly as possible, the above information.

(c) Indicate the wages paid for farm work.

(d) Make known the new diseases of plants which may appear in any part of the world, showing the territories infected, the progress of the diseases, and, if possible, the remedies which are effective.

(e) Study questions concerning agricultural co-operation, insurance, and credit in all their aspects ; collect and publish information which might be useful in the various countries for the organisation of works connected with agricultural co-operation, insurance and credit.

(f) Submit to the approval of the Governments, if there is occasion for it, measures for the protection of the common interests of farmers and for the improvement of their condition, after having utilized all the necessary sources of information, such as the wishes expressed by international or other agricultural congresses, or by congresses of sciences applied to agriculture or agricultural societies, academies, learned bodies, etc.

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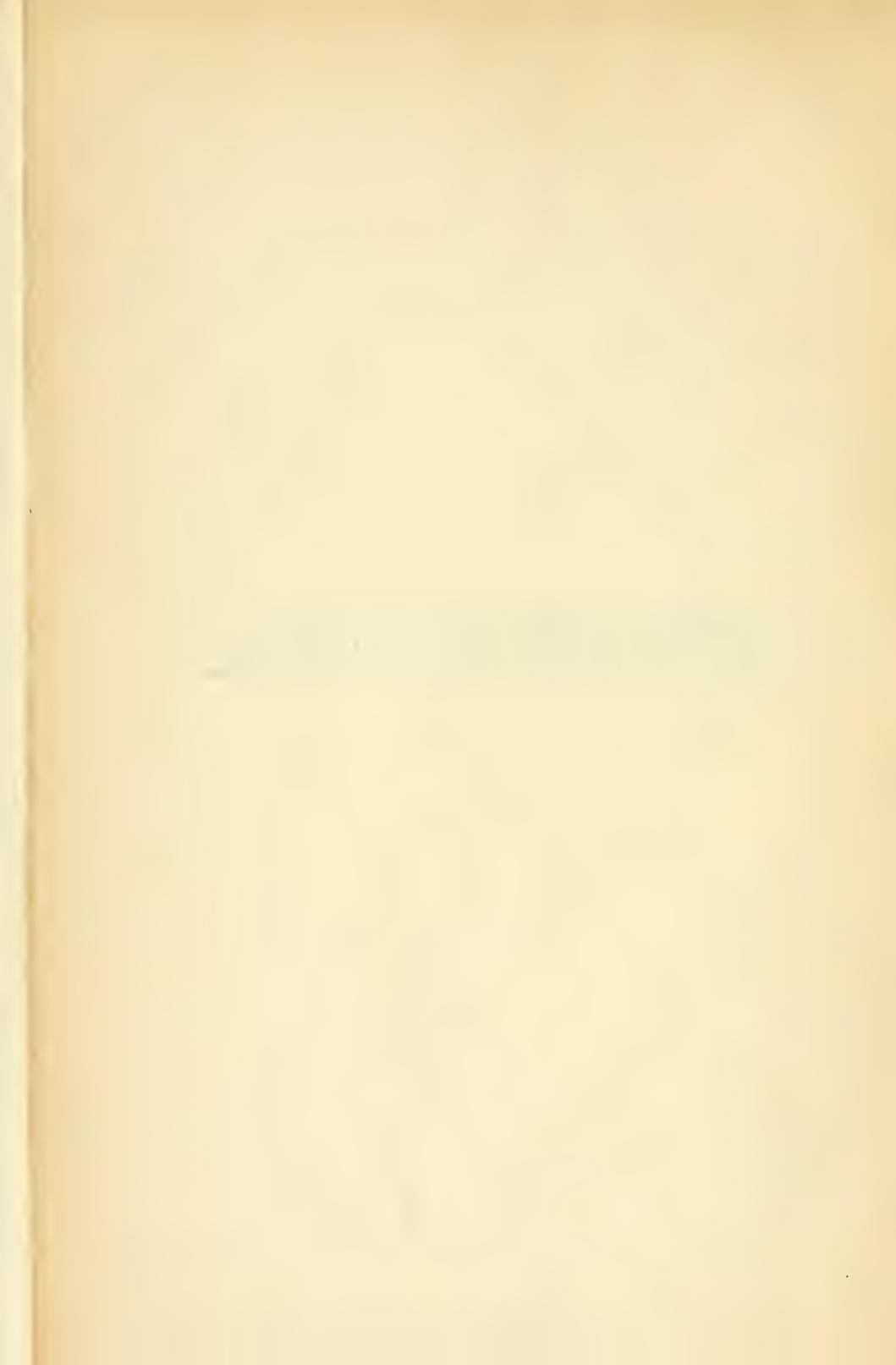
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THE INTERNATIONAL INSTITUTE OF AGRICULTURE.

The International Institute of Agriculture was established under the International Treaty of June 7th, 1905, which was ratified by 40 Governments. Seven other Governments have since adhered to the Institute.

It is a Government Institution in which each Country is represented by delegates. The Institute is composed of a General Assembly and a Permanent Committee.

The Institute, confining its operations within an international sphere, shall:

a) Collect, study, and publish as promptly as possible statistical, technical, or economic information concerning farming, vegetable and animal products, the commerce in agricultural products, and the prices prevailing in the various markets;

b) Communicate to parties interested, also as promptly as possible, the above information;

c) Indicate the wages paid for farm work;

d) Make known the new diseases of vegetables which may appear in any part of the world, showing the territories infected, the progress of the diseases, and, if possible, the remedies which are effective;

e) Study questions concerning agricultural co-operation, insurance, and credit in all their aspects; collect and publish information which might be useful in the various countries for the organization of works connected with agricultural co-operation, insurance, and credit;

f) Submit to the approval of the Governments, if there is occasion for it, measures for the protection of the common interests of farmers and for the improvement of their condition, after having utilized all the necessary sources of information, such as the wishes expressed by international or other agricultural congresses or of congresses of sciences applied to agriculture, of agricultural societies, academies, learned bodies, etc.

The Institute publishes: *a*) a Monthly Bulletin of Agricultural Statistics; *b*) a Monthly Bulletin of Agricultural Intelligence and Diseases of Plants; *c*) a Monthly Bulletin of Economic and Social Intelligence.

It has also published a volume on "The Organization of Agricultural Statistical Services in the Several Countries", and a volume "Statistics of Cultivated Areas and of Vegetable and Animal Production in the Adhering Countries" (an Inventory drawn up from documents published by Governments).

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INTRODUCTION

The *Bureau of Agricultural Intelligence and of Plant-Diseases* of the International Institute of Agriculture inaugurates its monthly publications with this Bulletin.

One of the duties of the Bureau is to review without delay the scientific and technical, and in part the legislative, literature of Agriculture and the allied industries. The result of this work is issued in the present Bulletin, which thus furnishes a periodical summary of the agricultural literature of the world.

The abstracts are grouped in large divisions corresponding to the chief branches of Agricultural Science and Practice. The subjects coming under each division will be classified, as far as possible, by countries, in geographical order. This geographical classification will be especially followed in the division regarding the *Development of Agriculture*, for it is this branch of information which throws light on the progress of agricultural work going on in each single country.

Agricultural progress in all parts of the world is considered with equal care in this Bulletin, not neglecting those less known countries which may furnish information valuable alike for farming, for industry and for trade.

The Service of the International Institute of Agriculture acts as a kind of *Agricultural Observatory*, and its observations are contained in this Bulletin, which may be considered as the daily register of the world's agricultural progress. It deals with all methods by which the production of field and forest may be increased, the quality of the products improved, and crops and stock protected against injury, disease, and pests.

The combating of pests, including those that are more directly harmful to man, must be one of the chief considerations. The very

possibility of bringing into fruitfulness vast territories in different parts of the globe is dependent, before all, on the destruction of injurious insects. It is precisely where the conditions of temperature, of moisture and soil are most favourable to high and varied fertility that pests harmful to man, to cattle and to crops, especially when conveying malaria and other human diseases, are formidable causes of desolation and the allies of barbarism.

The information collected in this Bulletin is restricted to the domain of the physical, chemical, biological and technical conditions which govern farm and forest. Statistical and economic intelligence forms the subject matter of separate publications brought out by other branches of the Institute. Thus, the Statistical Division publishes the *Bulletin of Agricultural Statistics* and the Bureau of Social and Economic Institutions publishes the *Bulletin of Economic Intelligence*. Besides these, the Library of the Institute issues a weekly *Bibliographical Bulletin*.

At the date of writing, November 1910, the Library of the Institute receives about 1400 periodicals, coming from 56 different States, Colonies and Possessions. Roughly speaking, more than 500 of these deal with physical and biological sciences, more especially in their bearing on agriculture, live-stock breeding, forestry, technology, rural engineering, land improvement and reclamation.

Besides these periodicals, the Institute receives a number of Bulletins and Reports sent by scientific and agricultural bodies, and by the Departments of Agriculture in the different countries. The number of these Bulletins will naturally increase as the International Institute of Agriculture gets into closer touch with the experimental stations and with all other institutions which contribute original research to the scientific and technical literature of agriculture. Recent enquiries show that there are in the whole world about 800 agricultural experimental stations, without counting allied institutions; and their number is constantly on the increase, as also that of the Bulletins and Reports they issue. A like increase occurs in the case of the technical reports published by Agricultural Societies, by Scientific and Agricultural Congresses, and by the different branches of the Departments of Agriculture in most of the important States and Colonies.

Such are the sources whence the Bureau of Agricultural Intelligence and of Plant Diseases will draw the information it publishes, besides Official Communications which Governments adhering to the

International Institute of Agriculture may see fit to make on agricultural questions, especially on Diseases of Plants, according to art. 9 of the Convention of 1905.

The *Bulletin of Agricultural Intelligence* is divided into two parts :

Part I: OFFICIAL COMMUNICATIONS.

Part II: AGRICULTURAL INTELLIGENCE.

The first is the only official portion of the Bulletin. It includes communications made to the International Institute of Agriculture by the adhering Governments, either directly, or through their delegates. In these official communications the Bureau of Agricultural Intelligence merely reprints or translates the information received. This part of the Bulletin will appear whenever occasion arises, and need not be a regular feature of the monthly issue.

The main part of the Bulletin is that of *Agricultural Intelligence*, drawn from books and the technical press, and from such special reports as may eventually be prepared for, and approved by, the authorities of the International Institute of Agriculture.

The Agricultural Intelligence is grouped as follows :

I. — Agricultural Science, Farming, and Agricultural Industries.

Development of agriculture in different countries — Scientific institutions
— Education in agriculture and forestry — Experimentation —
Biography — History of agriculture.

Agricultural Physics, Chemistry, Geology and Botany.

Field crops — Industrial cultures — Horticulture — Arboriculture — Forestry.

Stock-breeding — Animal Industries.

Industries connected with agriculture.

Agricultural Engineering.

II. — Diseases of Plants, Pests of Farm, Field and Forest.

a) Official Communications ;

b) Intelligence.

Rome, November, 1910.

ITALO GIGLIOLI, *Chief of Bureau.*

J. M. SAULNIER, *Chief of Section.*



AGRICULTURAL INTELLIGENCE.

NB. The Intelligence contained in the present Bulletin has been taken exclusively from the books, periodicals, bulletins, and other publications which have reached the Library of the International Institute of Agriculture in Rome during the month of October, 1910.

The Bureau assumes no responsibility with regard to the opinions and the results of experiments outlined in the Bulletin.

The Editor's notes are marked [Ed.].



**Development of Agriculture in Different Countries. — Scientific Institutions.
— Education in Agriculture and Forestry. — Experimentation. —
Biography. — History of Agriculture.**

Agriculture in Sind (British India). — *Journal of the Royal Society of Arts.*
London, No. 3016, 1910.

In studying the agriculture of Sind the first impression is of the great need for up-to-date agricultural implements and machinery.

Farming is still done with primitive implements, which involves a large outlay of energy with small result.

A well equipped Sind farmer is provided with a plough, a roller, a harrow, a rake, a pitchfork, and a drill. The plough has only one handle, a pole to which the yoke is attached, and instead of the ploughshare, a pointed stake, generally tipped with iron; and the soil is worked to about six inches' (15 centimetres) depth. The roller is simply a rounded beam of wood. The rake is a large piece of wood with five or six teeth. The drill is a piece of bamboo which is fixed to the plough at the time of sowing.

Government has tried recently, but without much success, to introduce more perfect implements, especially in the district of Chenab.

**British
India:
Sind**

MARYAUD. Portuguese India. — *Questions diplomatiques et coloniales.* Paris,
No. 326, Sept. 1910.

Portuguese India (4030 sq. kilom. = 1556 sq. miles, comprising Goa, Damão, Diu) lies on the Coast of Malabar.

The colony is obliged to import every year for its consumption hundreds of contos of reis worth of rice, the staple food of the natives, which the colony is unable to produce in sufficient quantity, owing to defective agricultural systems and insufficiency of irrigation. From the commercial point

**Portuguese
India**

of view, the port and the railway of Mormugão suffer from the formidable competition of Bombay. These are the two chief reasons that hinder the economic development of Portuguese India. The principal import is rice. The leading exports are: cocoa-nuts and copra (250 contos = 1 250 000 frcs.), spices or native aromatic plants, products of the betel-nut palm; live animals, salt, fish, and cocoa-nut oil.

The exports to Portugal have amounted to 2 100 000 reis (10 500 frcs.) those to Mozambique to 2 479 200 reis (12 396 frcs.), and to Angola 8800 reis. Perhaps the development of the port of Mormugão, the more intense cultivation of rice, and the introduction of a better navigation service, will help in advancing this district of India.

European Colonisation in Cochin China.—*Bulletin de l'Office Colonial*, No. 29, Paris, 1910.

The improvement of the large concessions proceeds very slowly and the results are unimportant. This state of things is mainly due to the difficulties which the European settlers find in recruiting the necessary labour for the cultivation of vast tracts of land. Further, those European settlers who have taken up rice-growing (and they are in the majority), are still suffering from the effects of the Mekong floods, against which the only protection would be a net-work of suitably arranged canals. The cultivation of rubber takes first rank amongst other cultures. The cultivation of pepper, of which there is also an important plantation in the district of Baria (in the province of Hathiên), is stationary. Cattle breeding would be of great benefit to the European settlers; the Baria district is extremely well adapted for stock, on account of its extensive pasture lands.

European Colonisation in Tonkin.—*Bulletin de l'Office Colonial*, Paris, No. 29, 1910.

The planters' efforts are obtaining good results in the cultivation of coffee and tea and in the raising of cattle. The plantations of *Ficus elastica* are being actively pursued. The greater part of the settlers cultivate a part of their lands on the metayage system, notably for rice and tobacco.

The cultivation of the perfume tree ylang-ylang (1), has been attempted in the province of Huang-Hoa, and is on the eve of yielding good crops.

European colonisation is not likely to extend beyond its present limits.

(1) *Cananga odorata*. [Ed.].

European Colonisation in Annam.—*Bulletin de l'Office Colonial*, No. 29, 1910, Paris.

In 1908 the European Colonisation movement extended to 54 estates, including 11 000 hectares of improved land as against 9 670 hectares in 1907.

Since January 1909, 450 hectares of land at Gio-Linh have been granted in provisional concession, as well as 400 hectares at Nhon-Thuân.

During the current year more than 40 000 plants of *Hevea Brasiliensis* have been planted at Phantiêt, in the South.

Last season's crop at Suigiao yielded a total of 1 400 kilograms of pure rubber and 300 of scrap on 4 hectares. The experimental cultivation of Liberian coffee, cacao-trees, "white cotton tree" (Kapak)(1) and kola trees promise well.

French
Indo-China

MARVAND. Macao. *Questions diplomatiques et coloniales*. Paris, N. 326, 1910.

Macao is the smallest of the Portuguese Colonies, measuring no more than 10 square kilometers. The opening of Hong Kong to European commerce in 1842 was a great blow for this Colony. At the present day its trade is developing, a considerable part of income coming from the monopoly in "cocido" opium (*exclusivo de opio cocido*).

The business transacted at Macao in 1905 amounted to 20 400 contos, (102 000 000 fr.).

Macao

The chief articles of trade are: raw opium, silk and cotton thread and tissues, rice, sugar, tea, aromatic woods, tobacco and Chinese "wine." The relations with the mother-country are very limited, this trade reaching the sum of 3 700 000 reis (18 500 fr.) for the exports and 6 900 000 reis (34 500 fr.) for the imports.

At present an economic danger threatens the prosperity of Macao. An international conference recently held at Shanghai adopted some excessively rigorous decisions on opium trade, the result of which will be greatly to the prejudice of Macao.

The economic and financial situation of Macao is far from being unfavourable, and its progress will be still more rapid when the railway discussed in the treaty that is now being negotiated with China has been constructed.

Irrigation Scheme in the Hawaiian Isles.—*The Louisiana Planter and Sugar Manufacturer*, Vol. XLV, No. 14, pp. 216-217. New Orleans, October 1910.

The planters of Hawaii have formed a project for the construction of

Hawaii

(1) *Eriodendron anfractuosum* D. C. or *Bombax pentandrum* Linn. WATT, Dictionary of the Economic Products of India. Vol. III, p. 258. [Ed.].

a new irrigation canal of the length of 145 kilometers, which will be the greatest work of irrigation in the Hawaiian Isles. By its means several thousand acres of good land will be rendered arable, and the greater part of this will be distributed for homesteads, according to the recent land-laws of Hawaii.

C. C. GEORGESON. **Corn Crops and other Products, and the Improvement of Cattle in Alaska.**—*Annual Report of the Agricultural Experiment Stations of Alaska for 1909*, Government Printing Office, Washington, 1910.

The culture of cereals and market garden produce, the cultivation of fruits and the breeding of cattle would prosper in Alaska all along the coasts and in the valleys sheltered from the north winds. In fact oats and barley are thriving over a vast extent of land in the interior of the peninsula, which is sheltered from summer-frost.

United
States;
Alaska

Amongst the numerous varieties experimented with at the agricultural station of Rampart, the best results have been obtained with the early varieties of barley *Pomer S. P. J. n. 18922* and *Yakutsk G. I. n. 574*, and with the early varieties of oats *Yakutsk G. I. n. 498*; their superiority is due to their early growth and to their short period of vegetation. A successful farmer, William Young, has obtained 2 tons of barley per acre and 1.6 ton of oats per acre, cut when green as fodder. Amongst the vegetables, the *Early White Ohio* potatoes and the Washington Wakefield cabbages are preferred; they yield an average return per acre of 6 and 5 tons respectively, a quantity which could be doubled by manuring.

Of cultivated apples there are probably none that could succeed in Alaska; hybridisation is suggested with the native variety *Pyrus rivularis* (Alaska Crabapple), which offers great resistance to the cold. Excellent results have already been obtained by crossing the best varieties of strawberry with the *Fragraria chilensis*, which grows wild along the coasts from Muir Glacier to Prince William Sound.

To solve the problem of cattle breeding, *Bos grunniens*, is suggested for introduction into Alaska, this is a breed from the Himalayas, suitable to the rough conditions of cold mountain regions. It is probable that by crossing this breed with the Galloway breed a good beast of burden would be obtained, provided with a fur equal or even superior to that of the practically extinct American buffalo.

New Territories for Agriculture in Canada.—*Weekly Globe and Canada Farmer*, Oct. 5th, 1910, Toronto.

Canada

The Home Secretary of Canada has published an illustrated pamphlet describing the lands explored during the past two years in North Saskatchewan, and in Alberta.

Of the 8 500 000 hectares of land visited, about 4 040 000 hectares are suitable for farming, and only await means of communication in order to be put under culture. The climate is good; and the cultivation experiments hitherto made there have been successful.

It is proposed to open out this new region by a railway as far as McMurray.

LETCHER. Agricultural Development in Acapulco, Mexico. (Improvements for Acapulco).—*The Bulletin of the Pan-American Union*, Washington, October, 1910.

Agriculture is continually expanding in Acapulco. The chief product is sesame, closely followed by cotton, rubber and sugar cane. The raising of cattle and the cultivation of fruit are also growing. The soil is very fertile, but a wise and experienced management is what is needed for Acapulco farming.

Mexico

Economic Development of Guatemala.—*Bureau of the American Republics*. Washington, September 1910.

The climate of Guatemala is a perpetual spring. There are two seasons: the dry season and the rainy season. The country consists of three zones: 1) the coast zone, where temperatures are prevalently high; 2) the upland and hilly region, from 2000 to 5000 feet above sea-level (600 to 1500 meters), where the climate is cool and temperate; 3) the high mountain region, over 6000 feet (1800 meters) above the sea, with a severe, dry and remarkably healthy climate.

Guatemala

The Government tries to attract colonists and promote the economic development of the country.

Agriculture and Cattle-raising in Salvador.—*Bureau of the American Republics*. Washington, September 1910.

The *Diario del Salvador* publishes the following information as to the live-stock and agricultural industries of the Republic.

Data supplied by the several municipalities show that in 1908 there existed on the *haciendas de ranches* of Salvador, about 284 013 head of cattle, 74 336 horses, 21 457 sheep and 422 980 swine.

Salvador

The following is the agricultural produce of the last six months:

Cheese	35 899 quintals	
Coffee	755 279	»
Cocoa	6 386	»
Rubber	5 194	»
Tobacco	11 666	»
Sugar	273 901	»

Maize.	1 219 914 fanegas (1)
Rice	94 669 quintals
Beans	163 608
Wheat	10 527 »
Sweet Potatoes	18 778 »
Yucca Starch	5 960 »
Balsam	1 448

Agriculture near Colon, Panama.—*Bureau of American Republics*, Washington, September, 1910.

Panama A Company has been formed, under the name of the *Ingenio de las Minas*, which is beginning agricultural operations with a capital of £350 000.

The Company proposes to cultivate cane sugar besides rubber, banana and other tropical plants. The Company has therefore secured the possession of several thousand acres of very fertile land and is actively pushing forward projects for an extensive sugar cane plantation.

DANIEL BELLET. **The Great Antilles.** — Guilmoto, Paris, vol. I, p. 320, 1910.

This volume treats of Cuba, Porto Rico, Haiti, St. Domingo and Jamaica. Each of its five parts contains a chapter with information on all the principal vegetable products of the Great Antilles.

Great Antilles In Cuba there is a considerable and varied wealth of forests. There are upwards of 3500 native plants, besides introduced species. The island possesses many precious woods, such as mahogany, ebony, and also good ordinary timber, like the Cuban pine.

Forests are especially abundant in the provinces of Santiago, Puerto Principe and Santa Clara. Fruit trees are very numerous; pine-apples, dates, cocoa-nuts, mangoes and even peaches, apricots and grapes are to be met with everywhere. The trade in pine-apples and bananas is developing rapidly, and attempts are being made to establish canning factories.

The most favourable soil for sugar cane is in the east of the Island. The best tobaccos come from the districts West of Havana, this culture occupying only the tenth part of the cultivated surface of the Island. The season for tobacco cultivation is from September to January.

The cultivation of coffee in Cuba is no longer what it used to be; and yet both soil and climate are admirably adapted to the growth of the coffee tree.

(1) A *fanega* is equivalent to $1\frac{1}{2}$ bushels and the Salvadorian quintal is equal to 104 lbs.

In Porto Rico the cultivation of the sugar cane, coffee and tobacco are important industries. The sugar production is being developed at the expense of coffee, the cultivation of which is passing through a crisis. There is a growing interest in the cultivation of tobacco, for which the soil is very favourable. Porto Rico is very rich in timber and precious dye-woods. Fruits are abundant, especially bananas, lemons and pine-apples. The introduction of *Sisal* hemp is being tried, and cotton culture is being developed.

The chief cultivation in Haiti is coffee. Vanilla also grows very well. The sugar cane and indigo have lost their importance for this country, and even the coffee tree is being replaced by bananas, cotton and the cacao tree, all of which seem likely to rise in importance. Medicinal, perfume-, rubber- and starch-producing plants, which are found to a certain extent everywhere in Haiti, might all be turned to account.

The Republic of St. Domingo has the same natural wealth and possibilities as Haiti; the starch-producing plants, oranges, pine-apples and fibre plants may be mentioned. At present the cultivation of cacao and sugar cane is carried on there; the cultivation of coffee is hardly to be recommended.

Sugar cane, coffee, bananas, cacao, tobacco, etc., still hold the chief place amongst the different cultures of Jamaica. The area growing bananas has nearly tripled in ten years.

Ginger is not a very important nor a growing industry in Jamaica. The production of cacao is rapidly increasing. The cultivation of tea has been tried, but not successfully.

VERHOLST. Agricultural Development in Venezuela. (Report of Meat Exports).—*Bulletin of the Pan American Union*. Washington, October 1910.

Cattle breeding in Venezuela is becoming a source of exportation; and the first consignment of frozen meat has been sent from Puerto Cabello to London. A Company is being formed with the object of creating a regular line of navigation between London and Venezuela, the ships being furnished with refrigerators for meat, fresh fruits and unrefined sugar (muscovado),

Venezuela

The first consignment of unrefined sugar for Europe was made some weeks back; it amounted to 75 000 lbs.

Progress in Peru.—*Bureau of the American Republics*. Washington, September 1910.

The agricultural resources of Peru, so far imperfectly utilised, have greatly increased during recent years.

Peru

Thus the exportation of sugar has increased 50 per cent in five years,

and still continues to increase, bringing large profits to Peruvian planters. Cotton growers produce a special quality of cotton and are able to command high prices; the European markets showing themselves ready to take the whole Peruvian production of this article. In the eastern provinces of the Republic there are vast extents of rubber-producing land; and a splendid network of rivers will permit the rubber to be transported cheaply by water.

The high prices of rubber are inducing the Government to open out the eastern forest land.

Progress on the Madeira River, Bolivia. — *India Rubber World*. New York, 1st October, 1910.

Bolivia

The Madeira River is destined to become the outlet for one of the richest rubber countries in the world: Bolivia. The works for improving sanitation in this valley are advancing rapidly, and they have already given satisfactory results, promising well for the opening out of the rubber region of Bolivia to the world.

A. M. MADDEN. Agricultural Development in Morocco. — *The Board of Trade Journal*. London, October 13th, 1910, p. 71.

A new economic feature in the development of the Shawia consists in the large number of farms owned by foreigners.

Morocco

The most up-to-date methods of cultivation and agricultural machinery and implements are already in use on some of these farms. Light steel ploughs, disk-harrows, cultivators, reaping machines and traction engines are to be seen on the quays of Casablanca.

An increase is likely in the number of farms owned by foreigners in the Shawia, to the great advancement of farming. The attention of the world is once more called to the great fertility and other agricultural resources of Morocco.

The Kpeme and Agu Plantations Company in Togo. (Pflanzungsgesellschaft Kpeme und Agu). — *Deutsches Kolonialblatt*. Berlin, 15th September, 1910.

Togo

The plantation of Kpeme has continued to prosper during the agricultural year 1909-1910, in spite of the unfavourable season; 483 000 cocoanuts have been gathered, whilst during the preceding year only the figure of 366 000 was reached: the copra was 75 tons. The number of cocoa-nut trees has already reached 60 000, half of which are yielding fruit.

The cultivation of Sisal occupies 79 hectares with 119 000 plants. The cotton growing amongst the young trees have been suppressed by the development of the latter, but the separate cotton-cultivation is extending.

The Agu Colonial Company continues to prosper. In one year the cacao harvest has risen from 12 500 kilograms to 23 630 kilograms. The *Kickxia* (1) rubber cultivation is growing well, but it has not yet reached the period of production. A mill at Agu is being built for the extraction of palm oil by the Haake system.

Cotton has been suppressed as a temporary cultivation in the tree plantations, on account of the vigorous development of the rubber-trees.

The International Scientific Congress in Buenos Ayres: Agriculture. — *Nature*, 2138, vol. 84, October 20th, 1910, p. 510. London.

The Agricultural Section of the Buenos Ayres Congress excited much interest, and a large number of papers were read. Juan A. Devoto, Civil Engineer, contributed a paper on researches on micro-organisms in milk. Dr. Wolffhügel read a paper on the zooparasites of domestic animals in the Argentine Republic. Mr. Suarez on the degeneration of the Malbec-Vine.

Argentina

The Agricultural Section voted a motion recommending the protection of the llama and of the vicuña.

Kew Bulletin, No. 7, 1910. — *Nature*, No. 2035, September 29th, 1910, p. 402.

No. 7 of the *Kew Bulletin* is for the greater part devoted to classification. J. S. Gamble publishes a long series of new species of *Protea* and other diagnoses of plants, as well as a second list of new *Lauraceae* of Malesia, mainly concerning the genera *Cinnamomum*, *Alseodaphne* and *Notophoebe*. M. O. Stapf publishes a description of the Australian plant *Epacris heteronema*. G. Massee describes some new exotic mushrooms, amongst which are a *Sphaerulina* and a *Phoma*, both found on a *Welwitschia mirabilis* in Damaraland. From the economic point of view the *Entypa caulivora* (Sphaeriaceae), a parasite gathered on a gum tree at Singapore, is more important; this parasite kills its host by obstructing with its mycelium the vessels of the wood.

Great Britain

A Colonial Institute in Amsterdam. — *La Quinzaine Coloniale*. Paris. n. 19, 1910.

At a meeting of the Society which founded the Colonial Museum of Haarlem, it was proposed to transform this Museum into a new Institution under the name of *Kolonial Instituut*, with headquarters at Amsterdam.

Netherlands

(1) *Kickxia*: an Apocynaea of Tropical Africa, Java and the Philippine Islands. (Index Kewensis, tom. II, p. 6). [Ed.].

A sum of 750 000 florins was already collected last June, and the new Museum can therefore be opened under excellent conditions.

Holland, ever at the head of the Colonial movement, is also about to create an Institute where all the colonial offices will be united; this is the only way of doing useful work for the economic future of the Colonies.

Forestry Education in Denmark. Statistics of Danish Forests.—*Quart. Jour. of Forestry*, Oct. 1910. London, pp. 300-305.

Denmark Danish Forest officials, whether for State or private employ, are trained by the Royal Agricultural Academy. The course lasts six years, and is attended, on an average, by 40 students.

The subordinate forest employés (foresters), of whom there are 90 in the forests of the State, do not receive their instruction in special schools, but follow a three-year theoretical and practical course in the districts and are then examined by a State Commission.

Observations on the influence of forests on climate and on rainfall are continued, but the results have not hitherto modified past experience.

The Experimental Forest Department is directed by a technical officer assisted by a Commission.

Facilities in Ceylon for the Study of Agriculture in the Tropics.—*Supplement to the Tropical Agriculturist*, vol. XXXV, n. 3. Colombo, Sept. 1910.

Ceylon At the Government Experimental Station of Peradeniya (Ceylon) the greatest facilities have been accorded to strangers desirous of studying the agriculture of tropical countries. Several Governments, amongst them those of Nyasaland, Sierra Leone, Southern Nigeria and others, have sent to Peradeniya their agricultural directors. Professors of botany, zoology, the science of forestry, and others, from England, Germany, etc., have visited the station, making a more or less prolonged stay.

Experimental Garden in Guadeloupe. — *La Quinzaine Coloniale*, Paris, 25th Oct. 1910.

Guadeloupe In view of the opening of the Panama Canal and of the expected increase of traffic in agricultural products, the Chamber of Agriculture of Guadeloupe is establishing an Experimental Agricultural Garden (*Jardin d'Essais*). A loan has been raised for the purpose.

Agricultural Course at Amani (German East Africa). (Unterrichtskurse in Amani).—*Deutsches Kolonialblatt*, Berlin, Sept. 1910.

German East Africa The Government of German East Africa has decided to institute a Colonial agricultural course at Amani for colonial officers, planters and cattle breeders.

The staff of the Amani Biological Agricultural Institute will be entrusted with the teaching, and with field demonstrations. The subjects treated will concern agriculture, tropical forests and cattle breeding. Special attention will be given to pests and diseases of plants.

Studies are to be made on the soil and on the climate, in their relation to production.

P. GUERIN. **Dr. Treub.** — *Revue Scientifique*. Paris, 15th October, 1910, p. 508.

“Dr. Melchior Treub, who recently died at Saint Raphael (Var), ranks high amongst botanists.

“Born at Voorschoten, Holland, in 1853, Dr. Treub was sent by the Dutch Government in 1880 to Buitenzorg, Java, as Director of the Botanical Gardens. He retired from service in 1909, settling in France.

“During the thirty years that Treub lived in Java, not a single year passed without his producing important contributions to vegetable biology. Treub has left several works on lacticiferous and climbing plants, and on myrmecophilous plants. In embryology, his observations on the development of the embryonic sac of parasitic plants are classical. In physiology, his researches on the presence of hydrocyanic acid in the higher plants led to the elaboration of interesting theories.

“The Institute of Buitenzorg, unique in the tropical world, with its various services, its numerous laboratories, and above all, its laboratory for foreign investigators, is Treub's monument. To him also is chiefly due the Department of Agriculture in the Dutch Indies.

“All who have worked in the Buitenzorg Institute remember the hospitality of its eminent Director and the liberality with which he facilitated researches. It is impossible to forget the kind response given by Dr. Treub to demands for materials for study; and many are the botanists whose researches have been advanced by specimens from Buitenzorg. The untimely death of Dr. Treub, the victim of the depressing climate of the tropics, and, it may be added, the victim of science, to which he devoted all his energies, will cause profound regret.,,

Nether-
lands
Java

Agriculture — Agricultural Physics, Chemistry and Botany.

ALF. B. **On the Constitution of Phytine.** — *Rev. Scient.* Paris, 29th October, 1910, No. 18, (II Sem.), p. 560.

France

In the course of recent researches on the chemical composition of the husks of barley grains, M. K. Geys has separated an organic phosphatic compound presenting all the reactions of phytine. His researches (*Ann. de Brasserie et de Distillerie*, 1910, n. 14) confirm the formula of phytine given by Neuberg and Brahn, who consider inosite as pre-formed in the molecule.

Oxydases. Chemistry at the British Association. — *Nature*, No. 2138, vol. 84, Oct. 20th, 1910, p. 518, London.

Great
Britain

During the meetings at Sheffield of the British Association in September 1910, Dr. E. F. Armstrong summarised our present knowledge on oxydases. Dr. Armstrong put the question whether oxydases should be considered as organic enzyme or as inorganic catalysts in a colloidal substrate.

The following facts support the second hypothesis:

- 1) the solutions of oxydases preserve their activity even after drastic purifications;
- 2) they invariably contain, after the most complete purification, traces of salts of manganese, iron and calcium;
- 3) their action may be imitated by the colloidal suspension of the salts of the above-mentioned metals.

On the other hand, there is evidence concerning the specific nature of oxydases and the existence of different oxydases.

Dr. Armstrong also described the remarkable blackening of the leaf of the *Aucuba japonica* when submitted to the action of toluene vapours or of those of chloroform. The blackening is due, according to the general opinion, to the oxidative effect of an oxydase.

Systematic researches have shown that this blackening was produced by most organic vapours, such as ethyl acetate, ether, benzene, etc., by carbon dioxide and by such salts in aqueous solution as cadmium iodide, mercuric chloride and potassium and sodium fluorides. All these substances possess but little affinity for water; and it is supposed that being able to pass through differential septa, they enter the cell and cause there osmotic disturbances, whereby the cell-contents become diluted and hydrolysis sets

in to restore equilibrium. This brings the various cell-enzymes into play, and a general degradation ensues.

This opinion is confirmed by determinations of sugar, or starch, or glucoside, contained in the leaf before and after the action of the stimulating substances. These determinations reveal, as a matter of fact, a great increase in the amount of the reducing sugar.

C. S. HUDSON. **Inversion of Cane-sugar by Invertase.** A Theory regarding the Influence of Acids and Alkalis on the activity of Invertase. — *Journal of the American Chemical Society*, Vol. XXXII, No. 10, Oct. 1910. Easton Pa., p. 1220.

In alkaline solutions invertase shows no activity; in slightly acid solutions this enzyme action reaches a maximum, which decreases rapidly as the acidity increases.

United
States

The author formulates various hypotheses based on different experiments.

C. S. HUDSON and H. S. PAINE. **Inversion of Cane-sugar by Invertase. The action of Alcohol on Invertase.** — *Journal of the American Chem. Society*, Vol. XXXII, No. 10, Oct. 1910, p. 1350.

From the practical point of view it is important to know the action of alcohol on invertase; in the first place because, alcohol is naturally present during the fermentation of cane-sugar by yeast, and the invertase is thus normally in the presence of weak alcohol; and secondly, alcohol is often used, though generally with little success, to prepare the enzyme in a solid form.

United
States

The authors have made various researches to ascertain the effect of alcohol of different strengths upon invertase.

The results show that the main effects are three: arrest of activity, precipitation of the enzyme, and permanent destruction.

If the alcohol contains some cane-sugar, the destruction is greatly retarded, and the invertase may be precipitated without any important loss of activity.

J. STOKLASA and W. ZDOBNICKY. **Photochemical Synthesis. Carbohydrates obtained without the intervention of Chlorophyll.** — *Chemiker Zeitung*. Cöthen, Sept. 1910, No. 102.

The experiments made show that the ultra-violet rays, acting on a mixture of carbonic anhydride and of hydrogen in the nascent state, bring about photosynthesis: a reaction of 2 molecules of carbonic anhydride on 2 molecules of hydrogen, produces 2 molecules of formaldehyde, and 1 of oxygen.

Austria

In the presence of caustic potash the formaldehyde polymerizes and gives rise to sugars.

Without the intervention of the ultra-violet rays, nascent hydrogen cannot act on the carbonic anhydride in such wise as to produce formaldehyde.

The nature of the sugars formed by this photosynthesis has not yet been determined.

One may surmise that formaldehyde is produced in the cells of plants containing chlorophyll as a first product of the reduction of carbonic anhydride by nascent hydrogen. The latter is formed in the process of respiration caused by glucolytic enzymes. The function of the chlorophyll in the assimilation-process would consist in the absorption of the ultra-violet rays.

Ultra-violet rays, when acting on a mixture of carbonic anhydride and water-vapour, also give rise to formaldehyde, but in small quantities, which do not polymerize to sugars in the presence of caustic potash.

The ultra-violet rays also appear to accelerate chlorophyll-formation in the cells of etiolated plants.

A. FERNBACH and E. VULQUIN. **Microbe-destroying Power of Yeast and of Cereal macerations.** — *C. R. Académie des Sciences.* Paris, 10th Oct. 1910, pp. 656-658.

France The poison produced by yeast is quite different from that found in cereals, each having a very dissimilar effect, according as it is measured by the multiplication of the yeast-cells or the activity of yeast-zytnase. The experiments have been carried out on the action of wheat maceration on the multiplication of the yeast cells, and on the activity of yeast itself, as well as on the action of yeast maceration in similar circumstances.

V. HENRY, A. HELBONNER and MAX DE RECKLINGHAUSEN. **New Researches on the Sterilisation of large quantities of Water by Ultra-violet Rays.** — *C. R. Académie des Sciences.* Paris, 17th October 1910, No. 16, pp. 677-680.

France The authors give results, obtained with a new apparatus of their own construction, for sterilising large quantities of water by means of the ultra-violet rays emitted by a mercury-vapour lamp.

The experiments for sterilising water were made first at the Sorbonne, then at Marseille, where the apparatus has been installed with the purifiers (*dégrossisseurs*) and filters (*préfiltres*) of Puech and Chabal.

The apparatus contains a quartz lamp of the Westinghouse Cooper Hewitt type, of 220 volts and 3 ampères, and it worked uninterruptedly from

August 19th till the end of September, with an average output of 25 cub. metres an hour.

Before treatment by the apparatus the water contained from 30 to 300 germs per cubic centimetre and from 50 to 1000 *coli* per litre (1). After treatment, it contained an average of 1 germ per cubic centimetre and no *coli*. The cost was 26 Watts-hours per cubic metre of water.

J. HERBERTSON. **Progress in Meteorology. Geography and some of its present Needs.** — Presidential address to the Geographical Section of the British Association for the Advancement of Science, Sheffield, 1910. — *The Geographical Journal*, Oct. 1910. London, p. 469.

Great progress has been made during the last decade in meteorology and climatology connected with geography.

The importance of climatological knowledge for tropical agriculture and hygiene has led to an increase of meteorological stations all over the tropical zone. Mr. Bartholomew's *Atlas of Meteorology* appeared at the beginning, and Sir John Eliot's *Meteorological Atlas of India* at the end of the first decade of this century.

Dr. Hann's *Lehrbuch* and the new edition of his *Climatology*, Messrs. Hildebrandsson and Teisserenc de Bort's great work, and the recent studies of the Upper Atmosphere are among the landmarks of progress. The record is marred only by the closing of the Ben Nevis Observatory when its work was becoming most useful.

To appreciate the progress of climatology, it is only necessary to compare the present number and distribution of meteorological stations with those given in Bartholomew's *Atlas* of 1899.

The author calls attention to the improved weather-maps and to the excellent pilot-charts of the North Atlantic and of the Indian Ocean, published monthly by the British Meteorological Office.

A. P. CERNŪI. **Agricultural Meteorological Station in the Government of Vladimir, Russia, with Observations on the Cultivation of Oats.** — *Selskoje Kosiastvo i Liesovodstvo*, Vol. CCXXXIV, year LXX, pp. 3-18, St. Petersburg, Sept. 1910.

During the last four years the meteorological stations in the Government of Vladimir have turned their attention to the study of agricultural meteorology. Clover, potatoes, rye, and oats have been the objects of their special attention. The results are more than satisfactory.

(1) *Bacillus coli*? [Ed].

With regard to oats, the period of vegetation, from sowing to harvesting, extends over an average period of 94 days, with a minimum of 80 in 1906 and a maximum of 107 in 1908. As oats are generally sown during the first half of May, the harvest is in September, and sometimes even as late as the first days of October, i. e. at a period when the average temperature is already low (10° to 11° C.) and when night frosts are of frequent occurrence. It must be added that though the average rainfall is low, light showers are frequent, occurring every two or three days, and even every day. Consequently the crop is incompletely dried, and is thus greatly deteriorated, the seed often getting mouldy, and the straw spoiled.

The remedy would be to sow earlier than usual, provided it can be done without seriously endangering germination and the growth of the oats.

The meteorological stations have been able to supply decisive information on the question, by fixing the last ten days of April as the most propitious period for sowing. The temperature of the soil is then fairly low ($8-10^{\circ}$ C.), but this in no wise compromises the crop, as it has been proved that seed sown in cool soil is particularly well adapted to resist drought.

Observations have also been made on clover, potatoes, and rye; but the material collected is still too incomplete to allow positive conclusions to be drawn.

Is it possible to influence Rainfall artificially? (Mathematics and Physics at the British Association). — *Nature*, n. 2138, vol. 84, Oct. 20, 1910, p. 515. London.

Great
Britain

During the proceedings of the *British Association* last September, Sir Oliver Lodge referred to the existence of a positive gradient of potential during fine weather, and of a negative gradient during rainy weather, and spoke of the possibility of influencing weather, by varying the potential gradient. He thought that rain might be produced in this way, opening a field of experiment for the enterprising capitalist.

Protecting Orchards from Spring Frosts. — *Journal of the Board of Agriculture*, Vol. XVII, No. 7, p. 558. London.

Great
Britain
and the
United
States

The prevention of damage to fruit crops from spring frosts by means of fires and smudges has been attempted by a few growers in England with some success. In those districts of the United States where fruit is grown on an extensive scale, considerable progress has been made in recent years in investigating the value of different methods. Recent experiments have proved that damage to fruit trees by frost can be controlled to a greater or less extent. Two methods have been principally adopted,

viz.: 1) heating the air by fires, and; 2) creating a thick smoke, or "smudge," as it is called, to diminish nocturnal radiation.

Heating the air by fires. — When well managed, this method is stated to be very effective. It is of little use when the wind is high, or when the temperature falls below 20° F. (— 6.6° C.). It is a great mistake to produce intense heat by very hot fires, because this creates a strong draught which carries the heat directly into the upper atmosphere.

The best results are obtained by means of numerous, but small, slowly burning, and well-distributed fires of coal, wood, or whatever fuel is cheapest. Crude oils have been tried, but they have the disadvantage of forming lampblack, which sticks to the leaves and fruit.

Oil heaters are, however, extensively used in America. In Colorado a grower who had heated a portion of his orchard in the spring of 1909, secured a fine crop of more than 15 000 boxes of apples, whereas several acres not protected by heaters did not produce a single box.

In another case, in New Mexico, 30 acres of orchard were heated with about 90 oil heaters to the acre, with the result that a full crop of fruit, valued at £5000 was obtained, while in the rest of the valley the apple crop was almost a complete failure.

Smudge Fires. — It is stated that the fires should be started early in the evening, before radiation begins. This method is well adapted for use when the night is not windy and the temperature is not expected to fall much below 27° F. (— 3° C.).

Stable manure with a little oil poured on it makes a good smudge fire; or mixtures of tar or oil with damp straw, hay, or sawdust.

Farmers' Bulletin, No. 401 gives an account of experiments conducted in 1909 in South Oregon. It indicates the fuel used, the number of heaters per acre, the time required for lighting, the cost, etc.

The conclusion arrived at by the United States officer, who was in charge of these investigations, is that frost injury to fruit trees may be prevented by the use of fires and smudges.

The Journal of the Board of Agriculture gives a Table of temperatures at which the principal orchard fruits are liable to be injured by frost, when in blossom, when setting fruit, etc.

The Weather Bureau of the United States issues and forwards by telegraph and telephone warnings and forecasts as to the occurrence of frosts and cold-waves.

J. MAURER, ROBERT BILLWILLER JR. and CLEMENT HESS. **Frequency and Distribution of Hail-storms in Switzerland.** Influence of Woods, Peat-bogs, Marshes, etc. (*Die Hagelschläge der Schweiz - mit einer Karte. Das Klima der Schweiz*, Bd. I, pp. 285-302. Frauenfeld, 1909-10.

Switzerland

Using the data collected by the Central Meteorological Institute of Switzerland, the authors have made a study of the frequency of hail-storms in Switzerland from 1883 to 1900.

The average frequency of hail during the period under consideration, the annual probability, and the percentage in the principal Swiss districts are given as follows:

		Frequency 1883-1900	Annual Probability	Percentage of Storms
Jura	Westrand	6.09	0.388	4.1
	Ostrand	4.55	0.258	3.0
Mittelland . .	Westrand	5.53	0.307	4.4
	Mitte	6.14	0.341	3.4
Voralpen . .	Ostrand	7.39	0.411	4.0
	Westrand	6.24	0.346	
Alpen	Ostrand	3.49	0.194	
	Westrand	1.91	0.106	
	Ostrand	0.81	0.045	

Percentage of Storms.

Alpengebiet .	Westlicher	3.6
	Voralpenrand . . .	
	Mitte	2.2
	Ostlicher	1.8
	Voralpenrand . . .	

It has been observed that woods have the effect of diminishing the intensity of hail-storms, provided however that they are very extensive, and that the neighbouring land does not favour the formation of fresh hail. Any water district, with river, marsh, peat-bog or lake, contiguous to a wooded mountain, leads to an increase in the violence of the storm.

These observations confirm many others that have been made and which go to show that large peat districts favour the formation of hail.

Influence of Electricity on Plants. (Mathematics and Physics at the British Association). — *Nature*, No. 2138, [Vol. 84, Oct. 20, 1910, p. 515. London.

Great Britain

At a meeting of the *British Association* last September, Sir Oliver Lodge, referring to the effect of electricity on plant life, explained that the experiments with which he had been connected showed that in dull weather

the plants were stimulated by electricity, and the effect was good; but in bright, sunny weather they were over-stimulated, with consequent bad results. He did not think that the action on plants was due to nitrification, but to some effect on the growing tips.

VIDAL. Protection against Hail. — *Revue Scientifique*. Paris, October 1st, 1910, p. 435.

At the meeting of the *Association française pour l'Avancement des Sciences* M. Vidal declared his belief in the possibility of preventing the formation of hail.

He spoke as follows:

"As far back as 1901 that we made public at the International Congress of Lyons our invention for preventing hail by the firing of rockets.

"We do not pretend to try and convert our adversaries; but we hope to arouse the interest of those who up to now have remained indifferent, and also of those whose opinion may have been influenced by the purely theoretical denial of some of our opponents, especially by the report of the experiments conducted at Castelfranco Veneto under the direction of Professor Blaserna.

France

"In the first place we may consider why the brilliant discovery of M. Stiger has not yielded results such as we had every reason to expect.

"Is this due to a false principle? or to unskilled application?

"The principle is certainly sound, because the action of sonorous or other vibrations on storm clouds is undeniable; but from the first the principle was applied under conditions which could not but lead to failure. How could one hope to make a gaseous projectile, such as the vortex-rings produced by the explosion, less dense than the air, rise high enough?

"This is the reason, and the sole reason, why the principle was abandoned; but as we did not lose sight of its real value, we had the idea, ten years ago, of replacing the vortex-ring by rockets, or by hail-dispelling peters which break up the clouds at a certain altitude.

"These new weapons have since then given practical proof of their work, and been more or less adopted; but in order to control hail-storms successfully, is it enough to discharge these rockets without any definite method over the lands intended to be protected? We do not think so. On the contrary, we have clearly shown, ever since the Congress of Lyons, that the points of defence of a given district may be at a considerable distance, and that its orographical features must be well known in order to fix precisely those strategical points which lie on the path of hail-storms. We have, moreover, made clear that it is essential to break up the hail-storms on their way, before they reach the district to be protected.

"It is in this method that, as we believe, the chief condition of success

in controlling hail lies. And it has this further advantage, that a great saving of expense may thereby be effected. At Gannat, in the Department of the Allier, in France, we are using it to protect 24 000 hectares (59 304 acres) of the rich land of Limagne, and we have less than eighty firing stations,

"The question, which is still disputed, as to the height at which our projectiles should burst remains to be considered. Numerous experiments as to their mode of action, and as to the altitude of the lower storm strata, have led us to the conclusion that the height ought to be between 400 and 500 metres (1312 ft. and 1640 ft.); and everything up to the present goes to show that we are right.

"However much we may be convinced ourselves, and can count fresh records of success every day, we must follow the wise advice of M. Violle and wait until the general irrefutable testimony of experience has proved the efficacy of the means we employ in our campaign against hail."

S. U. PICKERING. **Plant Growth in Heated Soils.** — *Journal of Agricultural Science*, Sept. 1910, Vol. III, Pt. 3, pp. 277-284.

The author begins by briefly alluding to the work of Darbishire and Russell and of Russell and Hutchinson, who have sufficiently proved that plant-growth is generally more vigorous in soils that have been heated, and that this increased vigour is mainly due to the altered bacterial conditions, though the increase in the soluble organic and nitrogenous constituents must also contribute to this effect.

At the same time the existence of a toxic substance, which may gradually disappear by a process of slow oxidation, and the increase (due to the action of heat) of the amount of soluble organic matter, would seem to offer an explanation of certain anomalies which have been observed in the growth of plants in these soils.

The author's experiments throw a new light on the subject.

On heating the soil, the soluble matter available for nutrition is increased, and changes in the bacterial condition are brought about, which conduce to increased vigour of the plants; but the heating also results in the formation of some substance or substances which are actively toxic. The proportion of toxin formed at low temperatures is small, and is generally insufficient to counteract those conditions favouring increased growth, but this proportion increases at a very rapid rate as the temperature rises above 100°, and its baleful influence is generally the preponderating factor; hence the results obtained of increased vigour with soils heated up to about 100°, and of greatly decreased vigour with those heated to higher temperatures. But the toxic substance is unstable, and gradually disappears by the action of air and moisture. Whence it results that when the soils

are used at once after heating, and when the cultivation, and the access of air, are reduced to a minimum, the toxic action will prevail, and there is no increased vigour of growth; whereas, under conditions favouring oxidation, the toxic action disappears, and increased growth becomes the predominant feature. The gradual recovery of plants grown in strongly heated soils, and the smallness of the toxic action in the case of second crops are illustrations in point.

Whether the substance which is toxic towards plant-growth is actually the same as that which is toxic towards germination cannot be settled at present; but the heated soils appear to be equally toxic as regards these two processes, and the toxin in both cases is equally susceptible to oxidation. Hence it is legitimate to assume provisionally that it is the same toxin which is active in both cases, and on such an assumption we can use the germination of seeds as a method for testing its presence in soils.

This is a point of importance, for germination experiments can be carried out in a few days, before a soil has had time to undergo any alteration due to the oxidation of the toxins; besides which, the germination of seeds is unaffected by the other factors such as the change in bacterial conditions and the formation of new soluble organic matter which would mask any toxic action in the case of plant-growth.

Another point of great importance is the different susceptibility of different plants to the action of the toxin. It would be impossible, of course, to draw any conclusions from the experiments made by the author showing that grasses generally are much less susceptible than other plants; but the results with grasses are sufficient to show that great differences in susceptibility exist.

This, the author thinks, may lead to some light being thrown on the obscure question of the action of grass on the vegetation of trees, and it also is suggestive of a fresh cause which may be assigned to the flourishing of certain species of plants in some soils and localities to the exclusion of others, in cases where differences of climate and food-supply seem insufficient to afford an explanation; for the formation of this toxin has been traced down to such a low temperature of heating, that it is impossible to avoid the conclusion that some of it must be present in so-called unheated soils.

E. A. MITSCHERLICH. **New Method of Physical Analysis of the Soil.** (Die physikalische Boden-analyse). — *Versammlung deutscher Naturforscher und Aerzte*, Abt. 5, *Agriculturchemie und landwirtschaftliches Versuchswesen. Zeitschrift für angewandte Chemie*. XXIII Jahrgang., No. 39, pp. 1840-41. Leipzig, 30 Sept. 1910.

Germany

The author criticises adversely the methods so far employed for the "mechanical analysis" of the soil by means of sieves and sedimentation;

he show hows the smallest differences in form, in specific gravity and in colloidal structure may produce striking differences in the determination of particles, even when they are of equal dimensions. Consequently these methods cannot afford any certain data as to the fertility of the soil and the facility with which the soil can be tilled.

Better results are obtained by a new method which is based on the researches of Rodewald, of Kiel, whereby it has been possible to establish a relation between the surface of the soil particles and its hygroscopicity, and also to differentiate the internal and external surfaces. Both the internal and the external surfaces let themselves be wetted by water; but the internal surface, as opposed to the external, may be wetted with water, but not with organic fluids of high molecular weight.

Now by determining the hygroscopicity of the soil, and by determining the loss of weight by drying, it is possible to measure its total surface both external and internal; and also its fertility, since the degree of solubility of the plant food contained in the soil depends from the extent of this surface.

Further, by determining the increase in weight of the dessicated soil when exposed to benzol vapour (the soil may be exposed over a 20 per cent solution of benzol in oil), a measure is obtained of the exterior surface of the soil particles in percentage of the dry soil: and the external soil surface must be considered a factor in the soil's capacity for being tilled while the total surface is a factor in its fertility.

The author endeavours to establish the last statement by reference to the figures he obtained recently by pot-cultures of mustard plants growing in sand mixed with increasing proportions of peat. He shows how the mustard yield rises with the increasing surface, that is, with the hygroscopicity of the soil, in accordance with his quantitatively formulated law.

A table is annexed to compare the actual yields with the yields calculated according to a proposed general formula.

C. T. GIMINGHAM. **The Scouring Lands of Somerset in England.**—*Journal of the Board of Agriculture*. Vol. XVII, No. 7, Oct. 1910, P. 529. London.

In certain central districts of the county of Somerset (England) pastures occur which produce herbage which causes severe scouring in cattle. Such scouring pastures are known locally as "teart" or "tart" land.

The first mention of "teart" land is to be found in an essay by Mr. Aubrey Clarke, (*Journal, Bath and West Soc.*, Vol. III, P. 52, 1855). The investigation was continued in 1862.

The subject was then left untouched till 1896, when a series of field experiments was planned and carried out, and analyses of herbage, soils, etc., were made. (*See Journal of the Bath and West Society*, from 1896 to 1903).

Characteristics of "Teart" Land.—The scouring properties of these pastures vary greatly in different places, and in certain seasons the same field will scour cattle much less than in others; in very dry summers scouring from this cause is hardly heard of. Moreover the scouring pastures in most districts are intermixed with perfectly sound fields.

If we refer to the geological map, we shall find that these lands coincide approximately with the Lower Lias formation.

Effect on Cattle.—The effect on cattle turned into a "teart" pasture is often manifest within twenty-four hours, and is always most noticeable in spring and autumn. In a short time the animals lose flesh, become "pile-haired" and go out of condition altogether; if left for any long period in a bad "teart" field, they may "scour themselves to death." Cows in milk are the worst sufferers, soon becoming very ill, and ceasing to yield the normal amount of milk. Lambs up to about a year old are also liable to scour. Fortunately, sheep and horses do not appear to suffer.

Water Supply.—Scouring on "teart" land has frequently been put down to the water supply, indeed, springs charged with mineral salts possessing aperient properties do occur in some "teart" fields. On the other hand, many fields, though supplied with perfectly good water coming from a different geological formation, are none the less very "teart."

Influence of Manures.—The application of manures increases the trouble. Probably this is simply because it increases the rapidity and amount of growth in the grass: it is always in seasons of rapid vegetation that scouring is most serious.

Influence of Frost.—It is remarkable that after the first two or three sharp frosts all "teartness" disappears and cattle may then be safely put into the fields.

Hay from "Teart" Land.—From the worst "teart" land, hay will nearly always scour cattle, though never so badly as fresh grass; but on most farms the hay is considered practically harmless, especially if allowed to get somewhat old before feeding.

The botanical examination and chemical analysis of the herbage of these scouring lands fail to give any explanation. It is almost certain that the *physical condition* of the "teart" soils is at the bottom of the trouble; the worst fields are those in which the texture of the surface soil is most "clayey", and where stiff clay subsoil comes nearest to the surface.

It has been noticed that when "teart" land is ploughed up, and laid down again after a time, the new pasture is not "teart" at first, becoming so gradually.

It is very probable that drainage *as near the surface as is practicable* would, in many cases, improve the surface texture and decrease the tendency to produce scouring herbage.

In one case a drainage at a depth of about 2ft. effected considerable

improvement. Even deep drainage (from 4ft. to 4ft. 6 in) has been known to do some good. A continuation of careful experiments on the effects of surface drainage is advisable.

EDWARD JOHN RUSSELL. **Ammonia in Soils.**—*Journal of Agricultural Science*. September 1910, pp. 233-245.

When soils are subjected to distillation at low pressures in the presence of small quantities of potash dissolved in alcohol, a definite amount of ammonia is evolved, the reaction soon coming to an end. It is considered that this amount represents the ammonium salts in the soil.

When larger quantities of potash are used, or when baryta or magnesia in aqueous suspension is substituted, the decomposition is not definite but continues indefinitely. During the progress of the first distillation, however, magnesia gives off the same quantities of ammonia as are produced by small quantities of alcoholic potash.

Two methods, based on these observations, are given for estimating the amount of ammonia in soils. If the amount of organic matter is not too high, distillation with magnesia at reduced pressure gives accurate results; otherwise it is necessary to use alcoholic potash.

The amount of ammonia in samples of soil taken at different periods of the year is found to be constant, but very small, being only about one or two parts per million of soil. The higher the amount of organic matter, the greater the ammonia content, rising to five or six parts per million on heavily dunged arable or garden soils.

As there is no tendency for ammonia to accumulate, it follows that the rate of nitrification must be greater than that of ammonia production, which, in normal conditions, is limited by this rate. Reviewing in the light of this observation the various methods of studying the rate of nitrification in soils, it is seen that they really deal with three separate conditions—the rate of ammonia production in soils, the rate of nitrification in soils and in pure culture solutions. In these circumstances it is not surprising that concordant results have not been obtained.

When ammonium salts react with a soil, a certain proportion enters into a stable combination which is not decomposed on distillation with alcoholic potash or with magnesia and is therefore not an ammonium compound. Its constitution has, however, not yet been determined.

J. G. LIPMAN and J. L. OWEN. **Some Bacteriological Relations in Soils in Green-house Conditions.**—*Journal of Agricultural Science*, Sept. 1910, vol. III, Pt. 3, pp. 301-310.

Soils in the green-house are exposed to conditions that are admittedly more or less artificial. The consequence is an abnormal multiplication of

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soil bacteria, which leads to an abnormally rapid oxidation of the organic matter. In the course of time the more readily decomposable portions of the organic matter in the soil become depleted, and this is followed, in turn, by a decline in the number of bacteria that will grow on agar plates. This decrease may be due to an accumulation of toxic substances which prevent the development of bacteria. It may, however, be added that the greatly decreased number of bacteria appearing on agar plates should not be accepted as absolute proof that the total number of micro-organisms in the soil had diminished. Possibly a compensating increase of bacteria that do not grow on agar plates, had occurred as for instance, the nitrous and nitric ferments, etc.

The experiments under consideration were carried out either in earthenware or glass pots, each containing 20 lbs of soil. The soils received different chemical or bacterial treatment, since it was the purpose of the experiments to determine whether such treatment would affect the numbers of bacteria producing colonies on agar plates.

The first series of experiments were to observe the effect of varying quantities of phosphoric acid, of citric acid, and of carbonate of lime.

The second series regards the influence of small additions of fertile soil on the bacterial contents of quartz sand well supplied with plant-food.

The third series was for the purpose of determining the numbers of bacteria in green-house soils as affected by additions of organic matter and of cultures of *Bacillus Mycoides*.

The fourth and last series of experiments was made to observe the influence of gypsum on the numbers of soil bacteria capable of forming colonies on agar plates.

The results of these experiments prove that in greenhouse soils there may be at first a very rapid increase of decay bacteria to numbers above the normal, and then a gradual decline to numbers decidedly below the normal. It seems also that the nitrifying organisms become more prominent as the others gradually decrease in numbers. There are, moreover, indications of periodicity in the increase and decrease of the decay bacteria in the soil.

As to the cause of the decrease in numbers, it may lie, as already suggested, in the gradual mineralisation of the organic matter and the partial exhaustion of the more readily available organic food. It is less probable that the decrease may be due entirely to the accumulation of injurious substances produced by the biochemical action of these micro-organisms, although this accumulation may be a contributing cause. It is conceivable how the readily decomposable organic food may become fixed in the bodies of the micro-organisms, and how, on the death and decomposition of the latter, the organic matter may again become available for the growth of other bacteria. This assumption would account for the periodicity in the increase and

decrease of decay bacteria in the soil. Moreover, the partial mineralisation of the organic matter and the accumulation of nitrates would favour the growth of algae which, in turn, would provide an additional amount of new organic nutrients encouraging, thereby, the multiplication of the decay bacteria. The algae would thus become one of the factors responsible for periodicity in the increase and decrease, not only of decay bacteria, but also of nitrifying and of nitrogen-fixing bacteria.

The conclusion arrived at is that it is the quantity as well as the quality of the available food that is of controlling moment in the growth of soil bacteria and that there is still much to learn concerning the conditions under which the utilisation of available plant-food by bacteria may hinder the growth of crops. The competition for food between higher and lower organisms may not always be favourable to the former, and it is therefore desirable that further knowledge lead to proper methods of soil treatment so as to turn the balance in favour of those micro-organisms which are useful to the growth of cultivated plants.

Portsmouth Water Works.—*Nature*, No. 2137, October 13, 1910, p. 471.

An illustrated article on the Portsmouth water works appears in *Engineering* for Oct. 7.

The borough of Portsmouth has recently ordered a new system of filter-beds and covered service reservoirs. The new works are situated at Farlington on the side of Portsdown Hill, distant five miles from Portsmouth.

The water supply comes from chalk springs at Havant and Bedhampton, where pumping stations are situated. The water is delivered through three rising mains to the filter-beds, from which, after passing through the service reservoirs, it gravitates to the town.

Previous to the construction of the new works, the water was delivered from the pumping-stations to two open service reservoirs on Portsdown Hill; these are now covered, and form part of the reconstructed scheme.

It was the practice under the old conditions to deliver the water in an unfiltered state from the open service reservoirs to the town. The raw water is normally excellent, owing doubtless to the under-ground chalk through which it passes, but discoloration occasionally occurs during wet weather following a period of drought. Ferro-concrete on the Hennebique system has been employed largely on the new constructional work.

Drainage Works in Turkey. — *The Board of Trade Journal*, London, No. 721, 1910.

The *Conseil Administratif des Vilayets* in conjunction with the Municipal Council of Salonica has prepared a number of projects for the improvement

of the town. Among these is one for the drainage of a large marsh in the Wardar district.

Grant for Irrigation Works in India.— *The Imperial and Asiatic Quarterly Review and Oriental and Colonial Record*. London, Oct. 1910, vol. XXX, p. 433.

The Secretary of State for India has sanctioned the increase of the grant for next year to 100 lacs of rupees, or £672 000, for the protection of the irrigation works in India. Meanwhile, if the monsoons do not fail, an attempt will be made to provide a supplementary grant for the Tindula irrigation project.

British
India

The expenditure from loan funds on new productive irrigation works in India during the past official year has amounted to about 156 lacs of rupees, or £1 048 632. 110 lacs, or £739 420, were spent in the Punjab alone, chiefly on the Triple Canal project. Of the rest, 17 lacs, or £114 274 were spent in the North-West Frontier Province, mainly on the Upper Swat Canal, also engineered by Punjab officers. Burma spent 12 lacs, or £80 664, and Madras, Bombay, and the United Provinces smaller sums.

Irrigation in Haiti. — *Bulletin of the American Republics*. Washington, Sept. 1910, pp. 536, 537.

In the lowlands of Haiti a large reservoir is in construction, which, when completed, will furnish abundance of water to irrigate a considerable tract of land, which is said to have been once highly cultivated under the old French régime, and to have yielded sugar-cane and other products plentifully.

Haiti

The yield has gradually declined owing to inadequate arrangements for the water supply during the dry season.

Irrigation in Egypt. (Die Bewässerung Aegyptens). — *Deutsche Rundschau für Geographie und Statistik*. Vienna, 10 September, 1910.

Mr. Jenidounia, Civil Engineer, has been authorised to submit to the Egyptian Government a scheme of irrigation for the zone comprised between Deirrut and Esne. According to his technical and financial project, this work will cost 6 000 000 Egyptian pounds (1) (156 000 000 frcs.), but the Government will subsequently derive therefrom a profit of 60 000 000 Egyptian pounds (1 560 000 000 frcs.). The Government will receive each year 500 000 Egyptian pounds (13 000 000 frcs.) in taxes, and the land owners will increase the value of their estates by 6 400 000 Egyptian pounds (166 400 000 frcs.).

Egypt

(1) The Egyptian pound = 26 frcs.

A German Irrigation Company in Egypt. (Deutsche Bewässerungsgesellschaft in Aegypten). — *Export*. Berlin, Oct. 6th 1910.

Egypt The *Upper Egypt Irrigation Company* is the first German Irrigation Company formed in Egypt. This Company owns 400 wells of great capacity which can supply the water needed for irrigating 42 800 feddan (1 feddan = 4200 sq. m.). The Company has a subscribed capital of 500 000 Egyptian pounds, and in accordance with an old Egyptian law it is entitled to one third of the crops obtained on the lands it irrigates. Phosphate deposits are found in the neighbourhood. Thus all the conditions requisite for obtaining three crops a year are combined. The district which comes under the sphere of influence of the Company is specially suited to the cultivation of cotton and of sugar cane. The Company will pay a dividend this year.

A. D. HALL and E. J. RUSSELL. **The Error of Experiment in Agricultural Field Trials.** (A paper read before the British Association. Sheffield, Sept. 1910). — *Chemical News*, Oct. 7th 1910. London.

The causes of error may be shown to fall under several heads:

a) *Lack of Uniformity in the Soil.*

Great Britain Even on an apparently uniform field, analysis demonstrates certain differences. A simple but excellent test is to ascertain the percentage of moisture in samples of soil collected at the same depth—6 or 9 inches—and as nearly as can be at the same time. The differences commonly amount to 5 (or in dry fields to 10) per cent of the moisture present. Another factor greatly influenced by variations in the soil is the amount of nitrates.

This affords an even more sensitive index of variation, since it depends on all the conditions favouring plant growth—moisture, temperature, air supply, and food-stuffs, these being necessary for the production of nitrates—and also on the amount of water percolating through the soil, nitrates not being retained like ammonium salts. Here, also, differences are found of the order of 5 or 10 per cent of the amount present on fields that appear to be uniform. These differences may be accentuated where there is a dip in the field.

These variations arise partly from natural and partly from artificial causes.

So many agents come into play in soil formation that uniformity can hardly be expected. Further, the purely artificial operations, such as tilling, cropping, manuring, and folding have a profound effect on the soil, persisting for some years. Frequently the treatment has not been uniform

over the whole field. For instance, drainage, whether artificial or natural, is rarely uniform; during a very wet winter it is not uncommon to see places in the field where wheat has been affected by differences arising either from lines of good drainage or patches of bad drainage. In other seasons the differences still exist, though not to so marked an extent.

b) *Lack of Uniformity in the Conditions of Growth.*

The conditions of the outside row of a plot differ from those obtaining inside the plot, and those on the outside of the field are much modified by the competition of hedges and trees. These difficulties can however be obviated. The unequal incidence of disease is sometimes very troublesome.

c) *Effect of Season.*

In manurial trials it is possible after a number of years to allow for the effect of season in a general way, especially as knowledge of the properties of fertilisers increases. But in variety trials the problem is much more difficult, and cannot yet be said to be solved.

Total Magnitude of the Error of Experiment.

An examination of the Rothamsted records shows that the error is 10 per cent on plots where the past treatment has for many years been uniform, where all weighing, measuring, and other operations are performed with the utmost care, and where the general conditions are favourable for experimental work.

Having regard to these considerations and the difficulties often encountered in field trials, the authors would not be prepared, as a general rule, to lay stress on differences of less than 15 per cent.

J. G. LIPMAN. **A method for the Study of Soil-Fertility Problems.** — *Journal of Agric. Science.* London, September 1910, Vol. III, Part. 3, p. 297-300.

Referring to the good results that have been obtained, especially in North America, where dairy farming is carried on extensively, by the growing of mixtures of legumes and non-legumes in pasture lands, the Author has experimented a new method that promises to be of service in the study of soil fertility problems.

“When considered from the nitrogen standpoint the combinations of legumes and non-legumes reveal possibilities of great economic importance. Should it be demonstrated that non-legumes could be provided with an abundant supply of nitrogen even in poor soils, by being grown together with legumes under proper conditions, it would become practicable not only to dispense with all or a portion of the nitrogenous manures employed for

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States

certain crops, but also to secure non-legumes with an increased proportion of protein in the dry matter. Accordingly a method was devised for the study of the reciprocal effects of legumes and non-legumes.

The method itself is very simple (the text gives the figure) the leguminous and non-leguminous plants (*e. g.* oats and peas) are grown side by side in two pots, the one pot being inside the other.

The outer vessel is an ordinary five-gallon glazed earthenware pot. The inner and smaller pots are made out of a very porous flint mixture; and differ only in that the inner pot in one case is glazed, while in the other case the inner pot is unglazed.

In arranging the experiment for the study of the relations of legumes and non-legumes, the small and large pots were filled with white quartz sand, the smaller pots being placed inside the larger.

Thus two portions of soil, identical in composition and supplied with the same fertilizer materials, were secured. The two portions of soil were separated from one another by a porous wall in the one instance, and by a non porous wall in the other. The legumes were planted in the small inner pot. Previous to planting the sand used as soil was supplied with all the essential mineral constituents and with a small amount of soil infusion in order to supply the bacteria for the inoculation of the legumes.

It was reasoned that if the legumes allow soluble nitrogen compounds to pass out of the tubercles and the roots, these soluble compounds will diffuse through the porous wall of the unglazed pot and supply nitrogen to the non-leguminous vegetation in the inner pot. On the other hand such diffusion cannot take place through the walls of the glazed pot and the non-legumes growing in it will starve for lack of nitrogen if none is supplied in the fertilizer material.

Accordingly, field peas and oats were planted in the outer and inner pots respectively.

No nitrogen being applied, the plants had no other source of supply except the atmosphere, or the slight amounts of nitrogen present in the seed or in the water used.

The outer pot contained about 80 lbs. of sand, the inner pot about 20 lbs. The moisture conditions were kept uniform.

The oats in the unglazed pot were sturdier and were making better growth. Evidently they were securing nitrogen from some source that was not available to the oats in the corresponding glazed pot. Every indication was thus supplied that soluble nitrogen compounds were diffusing through the unglazed porous wall and were being utilized by the oats.

We have here a striking proof of the ability of oats to secure an adequate supply of nitrogen when growing together with field peas in a soil

devoid of nitrogen. We have proof, further, that the nitrogen compounds supplied to the oats were soluble and diffusible through porous earthenware. Subsequent weighing and analysis of the oats grown in glazed and unglazed pots, respectively, showed not only a much larger yield of dry matter and of nitrogen in the latter, but also of dry matter containing nearly double the proportion of nitrogen as compared with that grown in the glazed pots.

This method may be employed for the study of the influence of various crops on the bacterial flora of soils; for the study of the effects of various fertilizers on certain groups of soil bacteria; for the study of the influence of different crops on one another when grown continuously and in rotation; and for the study of the so-called toxic effect of plant-root excretions.

In order to secure satisfactory results with this method it is necessary to have special porous mixtures for the preparation of the inner pots.

Mr. Lipman secured satisfactory porous pots by mixing the clay with 25 per cent of hard coal and 25 per cent of soft coal. The pots made out of this mixture are fired in the usual way.

As checks to take the place of the glazed pots described above, the same pots coated with asphaltum paint were used, being impervious to diffusible salts.

Sewage deposits in Septic Tanks. — *Rev. Chim. Indust. Paris*, Sept. 1910. Supplement.

According to Mr. Grassman, the purification of 13 635 000 litres of sewage water at Oldham, England, left 20 tons of deposit in the septic tanks, from which a ton of saleable fat was extracted, the remainder being utilised as odourless manure.

Great
Britain

ALEX. BAYER. **The Industrial Utilisation of Sewage-sludge.** — *Revue de Chimie Industrielle*. Paris, Sept. 1910, No. 249, p. 279.

Professor Honig, of the German Technical School, has been studying for the Municipality of Brünn the utilisation of sewage deposits. About 23 000 cubic metres of sewage pass through the Brünn sewers in 24 hours, and each cubic metre contains 16 664 gr. of solid matter, of which 41.95% are ashes, 4.02% fatty substances and 2.86% nitrogen. As the sludge of sewage cannot be conveniently used for manure, it has been utilised for making illuminating gas. For this purpose it is necessary to dry the sludge thoroughly and speedily. Mr. Abt, superintendent of the Municipal Board of Works in Brünn, has had an apparatus made for this purpose, the illustrated description of which is given in the *Revue*.

Austria

After discussing the results of the experiments made, Professor Honig concludes:

1. By mechanical and continuous treatment a moist sludge is obtained, 100 kgs. of which may be effectively dried by the combustion of 2 kgs. of cheap coal;

2. By distillation, 25 cubic metres of good lighting gas and at least 75 kgs. of ammonia will be obtained per ton of dry sludge;

3. The sewage, deprived of its sludge, can be easily purified: by a biological process or by being used for irrigation; in both cases the clear sewage water will require relatively small areas to get purified.

According to Prof. Honig, a population of 15 millions, could save 70 000 frs. per day by this process, while preventing the pollution of rivers and streams.

The World's Consumption of Nitrate of Soda during 1909. — *Nature*, No. 2138, Vol. 84, Oct. 20th, 1910, p. 502. London.

Chili The World's consumption of nitrate of soda during 1909 amounted to 43 996 996 Chilean quintals of 46 kgs. each, equal to 20 238 604 metric quintals, with an increase of 8 000 000 Chilean quintals, or 3 680 000 metric quintals, on the consumption of 1908.

Production of Nitrate of Soda in Chile. — *The Journal of the Board of Agric.* Sept. 1910, No. 6, p. 504.

Chili The Chilean Nitrate Combination was dissolved in 1909, after having for long ruled the production of nitrate of soda. In his report (*F. O. Reports*, Annual Series, No. 4510) on the trade of the district of Iquique, Mr. Hudson, British Consul, states that during the first year of free production, from April 1st 1909, to March 31st, 1910, the output increased by 7 732 325 quintals (110 lbs., that is 3 853 017 metric quintals) on the previous year's production, while the world's consumption for 1909 (January 1st to December 31st) increased by 4 559 769 quintals of 110 lbs. (that is 2 272 032 metric quintals).

The average price of 95% nitrate was 8s. 7½d. per Chilean quintal in 1907 (21.60 frs. per metric quintal), 7s. 6½d. (18.92 francs per metric quintal) in 1908; and, in 1909, 6s. 10½d. per Chilean quintal, namely 17.18 frs. per metric quintal of 100 kgs.

It seems doubtful whether the Combination will be renewed; nevertheless those who were most opposed to it seem inclined to discuss some new arrangement on similar lines.

A. BASTIDE. **Dangers attending the use of Crude Ammonia Liquor from Gas-works in Vineyards.** — *Journal d'Agriculture pratique*, Paris, No. 42, Oct. 20 1910, pp. 435,436.

The author calls attention to damage due to *Crüd d'ammoniaque* (ammonia liquor from gas works) in vineyards. The vineyard in which the *crüd* was spread, had to be uprooted. Oats sown on the same spot were blighted. On digging up the soil it was discovered that the *crüd* was still intact after 4 years. Roots of "3309" American vine stocks were planted, but none of them took; plantations were again made with all possible care, but they always met with failure. The only vines that finally prospered were isolated plants, growing in well decomposed mould. It is thus seen that the cyanides of the crude ammoniacal liquor from gas-works may work great harm as they retain injurious qualities for a long while.

France

FR. REIS. **Physiological Action of Calcium Cyanamide and Derivatives.** — *Biochem. Zeitschr.*, 1910, 25, 477-493; *Journal of the Chemical Society*, London, September, 1910, No. DLXXV, p. 801 (see also *Journal Chem. Soc. Abstr.*, 1910, 1, 465).

Cyanamide, the active and important constituent of nitro-lime, or *Kalkstickstoff*, is a powerful poison. It may act toxically not only on animals, but also on bacteria, on the organisms contained in vegetable mould, on germinating seeds and also on growing plants. Certain organisms, however, are able to live in a 0.1 per cent solution of Cyanamide. Sterile earth decomposes a solution of Cyanamide. Dicyanodiamide, dicyanodiamidine and diguanide in a 0.1 per cent solution may also be assimilated by certain organisms, but no formation of ammonia has been observed in these circumstances.

Germany

Cyanamide undoubtedly has excellent qualities as an artificial manure, and experiments have been made on plants in pure quartz sand in order to determine under what conditions it loses its toxic properties and becomes a source of nitrogen for the higher plants.

Similar experiments have been made with dicyanodiamide, sulphate of dicyanodiamide and diguanide. When the soil was watered with the solution of these substances before sowing, and there was no other source of nitrogen available the toxic action was very marked. But when the plants were already sufficiently well developed before the use of these compounds, the sulphate of dicyanodiamide could be employed within certain limits without danger; whereas the sulphates of dicyanodiamidine and diguanide do not serve as plant-food.

When calcium cyanamide is used as a fertiliser it undergoes some alte-

rations in the soil. These alterations are not well understood, but the formation of urea probably takes place, for it has been shown that calcium cyanamide may give rise to this compound in the presence of ferric oxide.

Atmospheric Nitrification by Electricity. F. Louis and C. Limb's process. | *Annales de la Société d'Agriculture, Sciences et Industrie de Lyon*. Lyons, January-June 1910, fasc. 1 and 12, pp. 22-25.

France A description is given of a process which makes it possible to obtain from 40 to 50 grammes of anhydrous nitrous gas per Kilowatt-hour. The product is nitrogen bioxide. By varying the conditions of the experiment it is possible to cause the production of a more or less large quantity of nitric acid at the expense of the nitrous acid.

The paper is illustrated with figures explaining the new process.

DAGOBERT TIMAR. **Process for producing Nitrogen Oxides.**— *La Revue de Chimie industrielle*, September 1910, 21st year, No. 249. Paris.

A process for the manufacture of oxides of nitrogen by electrical heating of a mixture of nitrogen and oxygen.

France The mixture of gases is made to pass through a special apparatus (*corps creux*), thence issuing in one or more expanding jets.

The process presents the following characteristics:

1) The *corps creux* is inserted in an electrical circuit and brought to a very high temperature.

2) The *corps creux*, which is heated by the electrical current, is in the form of a tube.

3) By modifying its internal diameter or the thickness of its walls, the *corps creux* is especially heated at the points where the gases are made to issue.

DAFFY WOLK. **Aluminium Nitride.** — *C. R. Acad. d. Sc.* Paris. July 25th, 1910; *The Chemical News*, No 2653, Sept. 30, 1910, p. 174.

France Aluminium absorbs nitrogen at 820-850° C. Below 700° the absorption is imperceptible. Dissociation takes place at 1100°, no definite product being obtained. The Aluminium Nitride which the Author prepared contains 33.6% of nitrogen (34.06 for Al_2N_3). It forms a gray amorphous mass, which is decomposed by water the more readily the lower the temperature at which it was formed. Ammonia has no specific action on aluminium.

Synthetic Ammonia. — *Rev. Chimie industrielle*, Paris, Oct. 1910, t. XXI, No. 250.

Mr. Johnson passes a mixture of nitrogen and hydrogen over a catalyser at a high temperature and under pressure. The ammonia which is formed issues at a low temperature and the apparatus is regulated so that fresh mixtures of hydrogen and nitrogen are introduced in proportion to the quantity of ammonia collected. The work is done at a temperature of 500° C., under a pressure of 200 atmospheres; uranium is used as the catalyser. (Recent British Patents).

Great
Britain

G. FINGERLING. **The Palmaer Phosphate. A New Fertiliser.** (Palmaerphosphat, das neueste künstliche Düngemittel). — *Mitt. über Weinbau und Kellerwirtschaft*, Geisenheim, Oct. 1910, n. 10, pp. 153-155.

In Germany, especially in Central Germany, deposits of phosphates exist in the Lahn and the Dill basins, near Wetzlar, Weilburg and Dillenburg.

Phosphates are found also in the North of Germany, in the Harz and in other regions situated towards the South.

Many of these mineral phosphates are not of a nature to be directly employed as fertilizers; still less can they be converted into superphosphate, on account of their low contents in phosphoric acid.

Germany

The electrolytic process invented by Palmaer allows even poor phosphates to be used economically. The process is based on the regeneration of the acid employed to dissolve the raw materials, thus greatly reducing the cost of manufacture.

Palmaer's phosphate contains from 36 to 38 per cent of phosphoric acid, of which about 95 per cent is soluble in a citric solution.

Experiments by Söderbaum with oats have shown that Palmaer's phosphate acts like superphosphate and is more efficacious than phosphatic basic slag.

GLASENAPP. **Natural Deposits of Phosphates in Russia. Systematic Exploration of the Russian Phosphate Deposits.** *L'Engrais*, Lille, Oct. 1910. No 15, p. 1194-1195.

In the provinces of Kastroma, Jaroslaw, Twer, Ismard and Kasan there are important deposits of phosphates, rich in phosphoric acid.

The explorer Archangelski has found natural phosphate deposits containing 26 % of phosphoric acid along the banks of the Isyasrani and the Kulna. Along the middle course of the Volga he has found deposits containing 22 % of phosphoric acid.

Russia

N. I. Andrussow, of Kiew University, has discovered important phosphate deposits in the peninsula of Mangischlah, at the North-East of the Caspian Sea.

New Phosphate Deposits in Tunis. — *The Board of Trade Journal*. London, No. 723, 1910.

Tunis Phosphate deposits have been discovered in the neighbourhood of Djebel-Gorrah (District of Teboursouk). Engineers have been sent to estimate their importance.

Madagascar Guano. — *Revue de Madagascar*, Paris, October 15, 1910.

Madagascar A recent decree authorises a planter of Nossy-Be to utilise the guano deposits of the islands of Nossy-Sutrana, Nossy-Borona, Nossy-Manitsa, Nossy-Andramona, Nossy-Notolo, Ratafany, etc. This concession is granted for 10 years.

G. F. SCOTT ELLIOT. **Electricity in Horticulture in Scotland.** — *The Gardeners' Chronicle*, No 1244, vol. XLVIII. Oct. 29, 1910, p. 314.

Some interesting results were obtained last summer from a small installation belonging to Miss E. C. Dudgeon, at Lincheden House, near Dumfries, in Scotland.

Scotland The apparatus consisted of a $1\frac{1}{4}$ HP gas engine, a 60 volt dynamo, a transformer and five of Sir Oliver Lodge's patent valves. The conductor wire was supported by ordinary telegraph poles at about five metres above ground. In fine weather the apparatus worked for about two hours towards sunset.

When the sky was overcast the discharges were kept on for four or five hours. In showery weather the discharges continued as long as the wires were sufficiently dry. The experiments lasted from the beginning of June until July 14, with interruptions (of a total of two weeks) for repairs.

The plants on which the experiments were made were oats, potatoes, beets, peas, strawberries and onions.

The oats received electric discharges for 177 hours. The seed was sown on March 28th, and the crop harvested on August 11th. The length of straw varied from 1.75 m. to 1.87 m.

In a neighbouring field, richly manured, oats, which had been sown the same day, only ripened 8 or 10 days later, and the straw was only from 1.35 m. to 1.45 m. long.

The grain was too much damaged by the sparrows for the quantity to be exactly determined.

The *potatoes* received electric discharges for altogether 224 hours. Excluding the small and diseased tubers, 263 lbs of potatoes were gathered in the plot under the electric discharge and 201 lbs in the plot which had not been so treated.

Beets, electrified, 98 lbs; non-electrified 84 lbs.

The electrified *peas*, *strawberries* and *onions* were all superior in quality and quantity to those which had not been electrified.

The experiments are to be repeated next year over six acres, or two and a half hectares.

Vitality of Farm Seeds. — *Journ. Bd. of Agriculture*, Vol. XVII, No 7, October, 1910, p. 563, London.

Miss Jean White recently read a paper before the Royal Society on the "Ferments and Latent Life of Resting Seeds" (*Proceedings of the R. Society, B. Vol. 81*) in which she gave the result of experiments on the longevity of cereal seeds from different Australian States.

Australia

Of wheat, seeds kept from 6 $\frac{1}{2}$ months to 4 $\frac{1}{2}$ years, germinated from 90 to 100%, Beyond 6 $\frac{1}{2}$ years the Wheat of South Australia began to show a noticeably higher percentage of vital seeds than the Wheats from the other States.

At 6 $\frac{1}{2}$ years, 74 % of the South Australian Wheat germinated, 42 % of that of Victoria and 39 % of that of New South Wales;

At 7 $\frac{1}{2}$ years, 68 % of the South Australian Wheat germinated, 16 % of the Victorian;

At 8 $\frac{1}{2}$ years, South Australian 32 %, Victorian 3 %;

At 9 $\frac{1}{2}$ years, South Australian 32 %, Victorian 0 %;

At 10 $\frac{1}{2}$ years, South Australian 28 %, Victorian 0 %;

At 11 $\frac{1}{2}$ years, South Australian 12 %, Victorian 0 %;

At 12 $\frac{1}{2}$ years, South Australian 4 %, Victorian 0 %.

Miss Jean White considers that the vitality of seeds depends chiefly on the dryness of the climate.

Tables are given indicating the results of observations on Oats, Maize and Rye. The vitality of each of these cereals is inferior to that of Wheat.

H. MICHEELS. The Action of Continuous Galvanic Currents on Germination. Académie Royale de Belgique. — *Bulletin de la Classe des Science*. Brussels, 1910, No. 1, pp. 51-104.

The Author makes a study of germinating wheat to which aqueous solutions of electrolytes have been administered. Numerous experiments have been made with solutions containing one or several electrolytes.

Belgium

It has been observed that both in simple and complex solutions even a feeble galvanic current is injurious to young plants.

The Author has also made investigations on the modifications caused by the passage of the current.

H. MICHEELS. Action of Anodic and of Cathodic Liquids on Germination.

Académie Royale de Belgique. — *Bulletin de la Classe des Sciences*. Brussels, 1910, No. 5, pp. 391-403.

Belgium

The experiments show that galvanic currents, passing through the aqueous solution of an electrolyte, act on seeds put to germinate in it not by the electric charges of the ions and electrons, but by the modifications determined in the solution.

The Author calls the liquid into which the anode is plunged the *anodic liquid*. Negative ions are contained in the cathodic liquid, while the anodic liquid contains the positive residues. The former are favourable to germination.

While the cathodic liquid is more favourable to the development of wheat, and, as the Author affirms, of seeds of higher plants generally, the anodic liquid, which got invaded by algae, appears to favour the lower forms of vegetation.

H. MICHEELS and P. DE HEEN. The Action of Alternating Currents on Germination.

Académie Royale de Belgique. — *Bulletin de la Classe des Sciences*. Brussels, 1910, No. 8, pp. 665-668.

Belgium

A continuous galvanic current is generally injurious to the germination of seeds. The authors have observed, in experiments on wheat, that an alternating current, even of low frequency, is, on the contrary, favourable to germination. Several tables are inserted in the text.

C. RAVENNA and M. ZAMORANI. Importance of Mucilage in the Germination of Flax Seeds.

— *Rendiconto della R. Accademia dei Lincei*. Estratto dal vol. XIX, serie 5, 2 sem., fasc. 5^o, pp. 247-252. Roma, 1910, Tip. Reale Acc. Lincei.

Italy

The germination of linseed is less regular when the seeds are steeped in water, to swell for some hours before sowing.

This fact, not observed with other seeds, may be attributed to the impoverishment of the seeds in mucilage, of which linseed contains a considerable quantity.

The first experiments were made with the object of discovering the differences in the ash and dry matter contents of young plants grown from

seeds deprived of mucilage and those from ordinary seeds. The seeds were soaked in distilled water for three or four hours renewing the water several times. Some of the steeped seeds were then put into pure silicious sand, an equal number of ordinary seeds being at the same time sown under similar conditions. After ten days the young plants were washed, dried at 100° , and reduced to ashes.

Seeds	No of seeds	No of seeds germ'd	Dry mat. grams	Ashes grams
Normal.	262 weigh gr. 2.5	255 or 97.32 %	1.5456	0.1766
Without mucilage	id.	194 • 74.02 %	0.8030	0.0706

Thus loss of mucilage appears to diminish germinative power, while the dry matter and ashes are very much less in steeped linseed than in ordinary seeds. The steeped seed produced weaker plants.

Comparative germination tests were made with ordinary linseeds and seeds deprived of mucilage, some of the latter being put to grow in sand to which the constituents that had been taken away with the mucilage were returned in the form of mineral salts and of sugar.

The mucilage extracted from 1 Kgr. of linseed was dried, reduced to ashes, and analysed. From 3.0420 gr. of ash the following constituents were determined, in grammes:

K	0.84	Na	0.20	Ca	0.31	Mg	0.12
PO ₄	0.046	SO ₄	0.19	SiO ₂	0.12	Cl	0.026

The comparative tests of germination were in the following order:

1. normal seeds;

2. seeds deprived of mucilage;

3. seeds deprived of mucilage but treated with a solution containing the constituent elements determined by the above analysis, and in the same quantities

For fear that the steeping might act unfavourably on germination, the control seeds were also steeped in water, but the mucilage taken from them was poured over them again as soon as they were sown. The following results are given:

1. Plants from mucilage-deprived seeds are deficient in dry matter and in mineral constituents;

2. Addition, during growth, to plants from steeped seeds, of the constituents lost during the steeping, renders the growth nearly normal.

This suggests that the mucilage of flax seeds is used during germin-

ation the same as other reserve materials. The experiments tend also to show that, *even during the period of germination*, plants may, in certain cases, avail themselves of mineral solutions.

C. RAVENNA and M. ZAMORANI. **Formation of Hydrocyanic Acid during Germination.** (Sulla formazione dell'acido cianidrico nella germinazione dei semi). — *Rendiconti della R. Accademia dei Lincei*, estratto dal vol. XIX, serie 5^a, 2^o sem., fasc. VII, pp. 356, 361. Roma, 1910.

Italy

After referring to the experiments of Jorissen, Soave, and Guignart, the Authors report investigations made on *Sorghum vulgare* and on *Linum usitatissimum*. They placed the seeds of Sorghum to germinate in metallic boxes divided into compartments, containing a layer of washed and calcined silicious sand and then moistened with distilled water. The boxes were divided into two series, one lot being in the dark and the other exposed to light, all other conditions being identical. When germination began, some young plants were, from time to time, taken from each lot. Whilst normal grains of Sorghum do not contain any hydrocyanic acid, the distillate of grains in germination gave in every case the Prussian blue reaction.

The results show that there is a formation of hydrocyanic acid during the germination of Sorghum seeds both in the light and in the dark.

In both cases the acid formed increases with the duration of germination up to a certain limit, beyond which it decreases.

During Equal periods of germination, the quantity of Prussic acid formed diminishes when the plants are kept in the dark.

Experiments on Flax seeds, give similar results.

Investigations followed as to whether the lower content in acid, observed in plants which had germinated in the dark, was due to their weaker content of carbo-hydrates owing to arrest in the assimilation of carbonic anhydride.

Flax seed was made to germinate under bells in which the air that circulated was deprived of carbon dioxide. In the control bells, the air was normal. It was found that plants living in an atmosphere deprived of carbonic anhydride contain less hydrocyanic acid.

In order to study better the influence of carbo-hydrates, Sorghum was made to germinate in pots on washed and calcined sand. Some of the pots were exposed to light, others were kept in the dark and the sand moistened either with water or with a 2 per cent glucose solution.

The analyses showed that the proportion of hydrocyanic acid is notably higher in etiolated plants that had been watered with the glucose solution. This suggests that carbohydrates play an important part in the formation of hydrocyanic acid during germination.

J. G. LILL. **Influence of Size, Weight and Density of Kernel in the Germination of Wheat.** — *Kansas State Agricultural College*. Experiment Station Circular N. 11, pp. 1-8.

Numerous experiments at the Experimental Station of Kansas State Agricultural College investigate the relation between the physical constants of seeds (weight, size and density) and their germinative power.

1) *Determination of the relations between the weight and germinative power of grains from the same ear.*

United
States:
Kansas

Degree	Number of grains observed	Number of grains that germinated	Percentage of germinative power
Above average weight	4 707	4 604	98.74
Below " " " " " " " " " " " "	2 972	2 877	96.80
Total	7 679	7 481	Aver: 97.77

There appears to be a difference of 1 % in favour of the heavier grains. Their germinative power is not so much above the average, as that of the lighter grains is below it; it is respectively 1.19 and 0.75 %.

2) *Determination of the relation between the size of the grains and their germinative power.*

The grains were divided into 5 groups, according to their length and their weight. We give a brief summary of the results obtained:

a) There was only a slight difference between the germinative power of the large grains and that of the small ones, and this difference was in favour of the large grains.

b) The largest grains were not always those that germinated best.

3) *The relation between the density and the germinative power of the grains.*

The germinative power is in direct relation to the density of the grains.

4) Selection according to dimensions is consequently not the method for obtaining good seeds.

H. J. ROBERTS. **Breeding for Type of Kernel in Wheat.** — *Kansas State Agricultural College*. *Exper. St. Bull.* 170, Manhattan, Kan., Sept. 19th, 1910.

There are great differences even among the purest varieties of wheat from the point of view of the type of kernel. Whence the necessity for selecting types which offer the most desirable form of grain.

United
States:
Kansas

In order to make this selection it is necessary to keep in mind two essential points:

1) Qualities affecting milling:

A short form is preferable in it, the bran is less, and the longitudinal groove is slightly marked.

2) To choose grains that pack well together, so that the bushel weight is high.

This question of the choice of an ideal form of grain is treated at length in Bulletin 190 of the Kansas Experimental Station. Observations made on 52 different varieties of wheat are brought together. The following describes the method determining the length of the grains:

Five hundred grains were selected for each variety and placed in groups of 100 each. All the grains are placed in a line, with the extremities of the grains touching each other; the length, measured in millimetres, is divided by the number of grains. The width is determined in the same way, but care must be taken to place the grains with their longitudinal axes parallel.

In both cases such uniformity of results were obtained for the hundreds of seeds examined in each group as to permit of a much smaller number of grains being considered sufficient for ordinary measurements.

Having once established for each variety of wheat the relation between length and breadth of grain, a morphological factor of great importance is established.

The average volume of each grain in cubic millimetres is established in the following way. A hundred grains are placed in a graduated test tube filled with alcohol at 95°, up to a certain level: the subsequent displacement furnishes the elements for determining the volume. The bushel-weight and the real volume are determined exactly.

In studying carefully the relations between these elements, the following conclusions regarding the best form of grains have been reached:

1) Varieties of wheat having identical average kernel-volume and kernel weight may attain a difference in weight of 3 lbs. per bushel, (1) difference due to the superior packing quality of a given type of grain over another. This property is the more marked in proportion as the ratio between length and width diminishes; this is the case with wheats that have short caryopses and are consequently more appreciated. As sales in Kansas are made by weight, and not by measure, farmers cannot but gain considerably by this process.

2) When the ratio between the length and breadth remains constant, the higher the average volume of grain, the greater the weight per bushel.

The best and most appreciated form of grain is therefore one that is short and bulky.

(1) The United States bushel equals 35.2 litres.

Field-crops. — Industrial Crops. — Horticulture. — Arboriculture.

EDWARD J. RUSSEL. Wheat growing and its present day Problems. —
Science Progress in the 20th Century, London, October 1910.

In order that a plant may grow satisfactorily, it must receive a sufficient quantity of food, water, heat, air, light, and be protected from all adverse influences.

By being rendered more favourable, these conditions may increase the produce; but each of them may set a limit to the growth of production.

Water, for instance: in the Punjab, in India, where the wheat is irrigated, several experiments have shown that by increasing the amount of water given to the crops the harvest is augmented up to a certain point, beyond which the effect is reversed.

Farmers tend to over-irrigate, to their own detriment and to that of the soil.

The irrigation of wheat is extending in India, Canada, the United States and in South Africa, and consequently the problems connected therewith are continually assuming more importance. It is necessary to be extremely well informed as to the periods when the plant has most need of water, on the effect produced by a larger or smaller quantity of water, and on the relations existing between the need for water and that for other food. Thus, Dr. Leather has proved that unmanured wheat needs 850 lbs. of water to form one lb. of dry matter; while 550 lbs. are sufficient to produce the same result with manured wheat. In very arid places, in Australia, the utility of phosphates administered in small doses has been demonstrated, because they stimulate the production of the roots, which descend deeper into the soil where there is more moisture.

The need of heat also varies during the different periods of the life of wheat. In its earlier stages it can support temperatures hardly above 0° C.; but in Western Canada the cold is too great and only spring wheat is cultivated. In order to enlarge the present wheat belt, varieties are used that ripen earlier, or nitrogenous manures are applied, because it has been observed that in the presence of nitrates growth begins at lower temperatures, and also phosphatic manures are used, which hasten ripening.

Insufficient attempts have been made so far to extend the southern limits of the wheat belt where the limits are set by the high temperature; but it

**Great
Britain**

appears that good results could be obtained in this direction with late varieties and with potassium manures.

The exhaustion of virgin soils by continuous wheat growing is a very interesting question. It has been proved that this exhaustion is not so much due to the absorption of the substances which produce the crops as by the loss occasioned by leaching and by the change in bacterial action. Experiments in Minnesota have demonstrated that out of 170 lbs. of nitrogen lost in one year by a virgin soil, 27 $\frac{1}{2}$ only were absorbed by the crops and 132 $\frac{1}{2}$ were purely and simply washed away and lost.

No means of stopping these useless losses, which go on in all the richest soils, is so far known, except that of alternating the wheat crops with grasses and leguminosae.

Another important question is that of the so called *strength* of wheat, that is, its greater or less aptitude for panification, which depends:

1) On its gluten content and the tenacity of the same; this property increases with the salts contained in the grain, and decreases with the amount of acids and alkalis;

2) On the greater or lesser quantity of gas formed during panary fermentation. This in its turn depends on the quantity of sugar and diastase, on the condition of the starch and its greater or lesser resistance to diastase action, etc. The influence of outside conditions on the *strength* of wheat is at present being studied. In general, damp soils grow feeble wheats.

At the experimental stations of the various countries some new varieties have already been discovered which permit the cultivation of wheat to be extended to regions where hitherto wheat-culture was impossible. And as these investigations proceed it is certain that the wheat-area must widen more and more.

L. DEGRULLY. *A New Method of cultivating Cereals.* — *Progrès agricole et viticole*, Montpellier, No. 43, October 23rd, 1910, pp. 501-502.

France

The Author has tried the new Demtschinsky method of cultivating wheat, which consists essentially in earthing up mould round the wheat in the course of its growth. Mr. Degrully applied the method to wheat and to maize, using the modification proposed by two German agriculturists, Messrs. Schöner and Zehetmayr, which consists in sowing in deep furrows. Special circumstances unfortunately prevented the harvesting of the wheat, but the maize gave remarkable results.

In one plot some rows of maize were sown according to the ordinary method, the seeds being put in about 8 cm. deep. In another plot some furrows were made 20 cm. in depth, at the bottom of which the maize was sown and then covered with 8 cm. of earth; when the plants reached the height of about 40 or 45 cm. the furrow was earthed up.

In the course of its growth, the maize sown in furrows was much superior to the other, and at harvest gave the following figures:

	weight of ears
Maize sown in the ordinary method	6 kg.
„ „ in furrows	13 „

The soil where the experiments were carried out was poor, it was not irrigable and the summer was very dry. The modified Demtschinsky method may, therefore, be suggested for hot countries and dry soils.

GRÉGOIRE. Disintegration of Straw (The production of Cereals). — *Revue économique et internationale*. Paris, N°. 1906.

The world's production of straw may be reckoned at 250 million tons. In the new countries, (Argentina, West of the United States) straw has practically no value. In Hungary (1) straw is used as fuel for the engines working threshing-machines. In countries where high-farming prevails straw serves for litter and is employed on the farms. But the value of straw as a fertiliser is not more than from 7.50 to 11.50 francs per 1000 kilograms. Straw is far from having the capital importance that was formerly attributed to it for the production of manure.

**Germany
and
Austria**

Kellner and Lehmann's investigations lead to the conclusion, that the fodder-value of disintegrated straw is 8 or 9 times greater than that of natural straw. Lehmann insists very much on the possibility and utility of connecting the works of a sugar-refinery with those for disintegrating straw. Practical experiments have been made at the sugar-refinery of Steinitz (Moravia) by Seidl, Bauriedl and Strohmén.

The Steinitz plant, which can serve for the provisioning of about 600 to 700 oxen, costs 17 000 crowns. The profit on straw-disintegration has been calculated at 2.57 crowns per 100 kilograms of straw.

The adoption of this system may be considered as equivalent to an increase of the area under culture. Lehmann's straw-disintegrating process, as it exists at present or with the improvements which experience will suggest, may react very beneficially on farming.

Experiments on Varieties of Rye in Minnesota. University of Minnesota. Agricultural Experiment Station. — *Bulletin*, No. 120, July 1910, p. 7.

Cross-fertilisation is very easily effected with rye, and very few varieties are really fixed. New varieties often appear but they do not long remain on the market as fixed varieties. The Experimental Station of Minnesota

**United
States:
Minnesota**

(1) Also in some provinces of South Italy. (*Ed.*)

has tried a great number of varieties since 1900, and has devoted its attention mainly to the production and selection of the best. The variety known as Minnesota No. 2, has been widely distributed in the United States.

The following table gives the product of Minnesota No. 2 Rye for each year since 1900 compared with the average crop of other varieties of Rye, cultivated in the State.

Year	Rye Minnesota N ^o . 2		Average of other varieties of Rye	
	Bsh. per acre	Hl. p. Ha.	Bsh. per acre	Hl. p. Ha.
1900	41.4	36.3	19.5	17.5
1901	30.8	27.7	19.3	17.4
1902	43.2	38.9	22.3	20.1
1903	54.3	48.9	18.4	16.5
1904	38.2	34.4	17.7	15.9
1905	32.5	29.2	18.2	16.4
1906	54.2	48.8	19.3	17.4
1907	28.9	26.1	18.5	16.6
1908	35.1	31.6	19.2	17.3
1909	35.2	31.7	19.0	17.1
Average for 10 years . . .	39.38	35.16	19.14	17.22

H. SCHIERNING. **The Ripening of Barley.**—*La Bière et les Boissons fermentées*. Paris, Sept. 1910, No. 9, p. 104.

This study on the ripening of barley forms the first part of the investigations of H. Schierning on the proteids of barley, in the grain and during malting.

In England the barleys richest in nitrogen are considered the best; but on the Continent, notably at Munich, the poorest in nitrogen are considered the most valuable. The fact is there is no agreement as to the relative proportion of proteids in starchy and hard grains, nor as to the effect of richness in nitrogen on the malting qualities of barley.

Kukla, Prior and Jolawetz, abandoning the determination of total nitrogen, came to the conclusion "that the richer barley is in non-coagulable protein the less suitable it is for malting purposes." According to Schierning this is incorrect but; it is a great step forward to have given up

the valuation of malting qualities on the contents of nitrogen in the grain, giving instead a greater weight to quantitative and qualitative methods.

However, according to Schierning, it is not possible to arrive at the valuation of barley for malting by determining the proportion of the components of its dry matter, since malting and beer are so different in the different countries.

The Author has studied the changes in composition of the barley grain, in successive stages of development, of the wort and finally of the beer.

Schierning concludes, as regards the first part of his work, that the determination of the total nitrogen cannot serve as a basis for valuation. The time which passes between the first stage of maturity (green maturity) of the grain and the last (full maturity) is of great importance. During ripening the soluble nitrogen becomes insoluble. Similar changes have been verified in 1902 for carbohydrates by G. André.

V. ECKENDRECHER. **Valuation of Malting Barleys.** (Oktobertagung der Versuchs- und Lehranstalt für Brauerei in Berlin 1910. Sitzung der Rohstoffabteilung).—*Tagesz. f. Brauerei*, VIII, J.; N. 239, 1273-74. Berlin, October 12, 1910.

At the XVIIth Exhibition of Barley and Hops, held at Berlin from October 10 to 14, 1910, the following exhibits were noticed:

Germany

Summer Barleys.	187
Winter Barleys	6
Brewery Wheats	27
Total	220

These samples took altogether 12 First Prizes, 25 Second Prizes, 36 Third Prizes and 30 Certificates. The greater part of the prizes went to the products of Silesia and Prussian Saxony.

As the points considered in judging favoured the *Imperial* types, in particular the *Goldthorpe* Barleys, some opposition was made and the regulations were modified as follows: the lower albuminoid-limit is raised from 9 to 9.5%; the higher limit of the weight per 100 grains is lowered from 41 to 40 gr.; the points as to the fineness of the husk are calculated at from 1 to 9 instead of from 2 to 18; the points for colour from 1 to 5; the impurities from 2 to 18. As regards moisture one point is taken away for a water percentage of 15 to 16%; 2 points for 16 to 17%; 3 for 17 to 18%, and 5 above 18%. These regulations permit the superiority of the *Goldthorpe* barley to be maintained, but they favour also the varieties *Erectum* and *Nutans*.

Barleys for malting have been much improved in Germany, bringing the German products to the same level as the best in other countries.

The better to encourage this improvement, a Propaganda Committee has been constituted, which has already formulated the "golden rules for the cultivation of barley for malting". Upwards of 16 000 copies of these "Golden Rules" will be distributed throughout Germany. A leaflet entitled "Advice for the next harvest of malt barley, etc." will be published.

HITIER. Increase in the World's Production and Consumption of Oats.

— *L'Engrais*. Paris, No. 42, Oct. 21, 1910, pp. 1171-1173.

In spite of the reduction in the number of draught animals and of the progress of mechanical traction, the production and consumption of oats in the world continues to increase. The oat crop in Europe in 1909 was a very heavy one; notwithstanding this prices have continued to rule high. The development of the cultivation of oats in America is considerable. There is, therefore, no need to fear a reduction in the markets for this staple; on the contrary, the demand is rising. This is due to the fact that horses are better fed, and oats are being used more and more as a feed for farm animals. Oats now form part of the rations of sheep, of cattle fattened for market, and even of milk cows. Sweden, where stock-breeding is on the increase, consumes more and more oats, and the home production is inadequate to meet the demand. Therefore farmers who have been prevented by unfavourable weather from sowing wheat in time, can find compensation for their loss by sowing oats.

M. HITIER. The Composition of some Varieties of Oats. — *Bulletin des Séances de la Société Nat. d'Agr. de France*. Paris, July, 1910, N. 7, pp. 607-613.

At the Saint Susanne Farm (Aisne), some experiments were made in 1908-09 on the yield of several varieties of oats. The soil where the experiments were made is sandy and poor. The following tables give the results.

YEAR 1908.

Oat Varieties	Extent of each plot	Total yield		Yield per hectare		Weight of hectolitre
		in straw	in grains	in straw	in grains	
	hectares	quint.	quint.	quint.	quint.	kilos.
Noire Champenoise . . .	1.3750	51.60	35.00	37.52	25.45	51.700
Jaune des Salines . . .	1.2350	38.10	28.00	29.65	21.79	46 000
Noire de Mesdag . . .	0.6960	19.50	13.20	28.00	19.10	47.200
Blanche de Ligowo . . .	0.6880	20.50	17.60	29.79	25.58	52.000

YEAR 1909.

Oat Varieties	Extent of each plot	Total yield		Yield per hectare		Weight of hectolitre
		in straw	in grains	in straw	in grains	
	hectares	quint.	quint.	quint.	quint.	kilos.
Noire Champenoise . . .	1.47	42.60	27.50	29.00	18.75	48.200
Jaune des Salines. . . .	1.35	50.80	32.50	37.60	24.00	45.000
Noire de Mesdag. . . .	1.40	40.60	38.00	29.00	20.00	46.300
Blanche de Ligowo . . .	1.44	52.80	36.00	36.70	25.00	48.700

Numerous other tables give the results of the analyses of the grains and straw of several varieties of oats.

MARK ALFRED CARLETON. **Ten Years' Experience with Swedish Select Oats.**—*U. S. Department of Agriculture. Bureau of Plant Industry. Bull. N° 182, Washington, September.*

The variety of oats most extensively cultivated in the region comprised between the Great Lakes and the Rocky Mountains is the *Swedish Select*. The annual production in this region already reaches 50 000 000 bushels (18 million hectolitres). This variety has completely substituted the varieties formerly cultivated. This oat, which was not known until 1889, is the one most in favour, and the extent over which it is grown, in Wisconsin and the neighbouring districts, is increasing every year.

The *Swedish Select* was introduced into the United States by Mr Carleton in 1899, after an exploration into the cold and almost arid regions of Russia and Western Siberia to seek for cereals adapted to the climate of the United States. Two other varieties were introduced at the same time, of which one, the *Tobolsk*, is excellent; but the *Swedish Select* is much superior to all others. It comes originally from Sweden, where it had undergone selection for many years, and was then transported into Russia, into the province of St. Petersburg and into Finland, in which countries it has become better adapted to cold and dry climates.

United
States

N. P. NASSAU. **A New Maize from China.**—*Bulletin of the Department of Agriculture, Bahamas, Sept. 1910, Nassau, Bahamas, p. 85.*

China

The Bureau of Plant Industry of the U. S. Department of Agriculture has issued Bulletin n. 161, entitled *A New Type of Indian Corn from*

China, giving an account of a new variety of maize obtained recently from China.

The variety of Indian corn here described was introduced from Shanghai, China, and appears to be distinct from all hitherto known types. The plants possess the following unique characters:

The leaf blades on the upper part of the plant stand erect instead of being borne in a more or less horizontal position, as in the ordinary varieties; those on the upper part of the plant are in many cases all on one side of the stem.

Instead of the ear pushing out before the silks appear, the silks are produced directly at the base of the leaf blades, before the young ears emerge.

The texture of the endosperm is unique, and cannot be referred to either the starchy or horny types, common in our cultivated varieties. It resembles the horny endosperm in location and hardness, but differs in texture and optical properties.

The early developments of silks and erect leaf blades combine to produce an adaptation which ensures pollination, and prevents the silks from drying out. The pollen is blown against the erect leaf blades, and accumulates in their bases. The silks are pushed into these accumulations of pollen, and become pollinated before they are exposed to the air.

Xenia characters in hybrids appear for the most part to follow Mendel's laws. Coloured aleurone is dominant to transparent aleurone; yellow endosperm is dominant to white endosperm, and horny endosperm is dominant to waxy endosperm.

In explanation, it may be stated that *Xenia* is the name given to the process by which pollen, in hybridization, has an effect on the character of other parts of a seed, or fruit, than the embryo; for instance, it has been found that, when ears of a yellow corn are pollinated with pollen of a maize whose distinctive colour is red, the resulting ears contain yellowish-red and dark-red grains as well as grains similar to those of the normal mother plant. The colour really resides in the aleurone layer of the endosperm, that is in the outer layer of cells of the plant food in the seed, which contain a large proportion of nitrogenous food-bodies. An extension of the statement that *Xenia* characters in hybrids appear mostly to follow Mendel's laws, in relation to the particular instance that is dealt with above, may be provided by saying, broadly, that if plants possessing coloured aleurone, or yellow or horny endosperm are crossed with those having colourless aleurone, or white or waxy endosperm, the resulting hybrids will all have seeds with coloured aleurone, or yellow or horny endosperm.

The discovery in China of a distinct type of maize has bearing upon the historical question whether maize was known in the Orient before the discovery of America. Though maize undoubtedly originated in America.

the nature of the historical evidence regarding the extensive cultivation of maize in China in the latter part of the sixteenth century seems to preclude the idea of very recent introduction, leaving open the possibility that this specialized type of corn has developed in China. The generally accepted view to the contrary is further thrown into doubt by references to its widespread use, and introduction from the West, that occur in Chinese literature published during the sixteenth century.

Maize and Citrus Show at Johannesburg. — *The Agr. Journal of the Cape of Good Hope*. Vol. XXXVII, N. 3, pp. 261-266. Cape Town, September 1910.

The recent Exhibition at Johannesburg has shown that South Africa is in some parts especially favourable for the production of the best varieties of Maize.

The *White Dents* variety gave excellent results as well as the German yellows.

The first prize was taken by the variety *Hickory King*, grown in Natal.

South
African
Union:
Transvaal

D. HOOPER. **The Composition of Indian Rice.** Department of Agriculture, Bengal.—*Quarterly Journal*, Vol. IV; N° 1: pp. 4-48. Calcutta, July, 1910.

The analyses of 159 samples of Indian rice have shown that the average percentage of albuminoids is higher in the rice of East-Bengal, Assam and Bombay than in the rice of Cuttack and the Central Provinces. The percentage varies from 5.44 to 9.81 %.

It has further been found that the market valuations correspond to the nitrogen content. In this connection the *Ambemohar* rice of Belgana and the *Jeera Salai* of South Kanara are recommended, as they contain more than 8 % of albuminoids.

British
India

Nevertheless, the most important conclusion appears to be that the good feeding quality of the rice is independent of its appearance, and of the variety cultivated. Quality is due to cultivation. The rice with the best composition is in fact obtained by cultivation in abundantly manured virgin soils. The Author insists, therefore, on the importance of manuring in order to improve the rice production, both from the commercial and alimentary point of view.

LOUIS GAY-LUGNY. **Rice Production in Indo-China.** — *Du commerce extérieur de l'Indochine*. Paris, Emile Larose, libraire édit. 1910, pp. 8-22.

Amongst the French Colonies of Indo-China, Cochin-China is well adapted to the cultivation of rice, on account of its labour conditions, climate, nature of the soil and the character of its inhabitants. The surface cultivated

French
Indo-China:
Cochinchina

may be estimated at 1 200 000 hectares, producing annually an average of 800 000 tons; of which a third only is consumed on the spot.

One half of the Mekong-delta, the principal centre of cultivation of this cereal, is left uncultivated: it is therefore possible to increase enormously the rice production of Cochin-China. The sustained and regular demand in the Far East assures a constant outlet for this produce.

Rice Inspection and its Results in Japan. (Prefecture Oita, Empire of Japan).
Tokio, May 1910.

Japan

The lack of efficacious control over rice production and rice-trade, which became accentuated in Japan with the decadence of the feudal system, had very serious effects on the rice trade of Japan.

The *Regulations of the Rice Improvement Guilds*, which have been established by the Japanese Government and applied with praiseworthy vigour, have proved beneficial.

The inspection is mainly exercised over the drying of the rice, on the quality, the form and colour of the grain, on the weight and the packing.

The prefecture of Oita annually consumes 600 000 *koku*; from 10 to 12 % of which were lost previously in consequence of the imperfect system of preparation. This loss is to day limited to from 5 to 6 % (1).

C. CHALOT. A Perennial Rice Plant in Senegal. *Journal d'Agriculture pratique*. Paris, No. 40, Oct. 6th, 1910, pp. 445-446.

French
West
Africa:
Senegal

Mr. Ammann has found, in the district of Richard Toll, in Senegal, a perennial rice plant, the roots of which are real rhizomes, capable of reproducing the plant indefinitely, without the need of cultivation. This plant is being studied at the *Jardin Colonial*. The diffusion of this species may have very important results for Africa and for all hot countries where rice is raised.

HAVIK. Rice Straw and the Paper Industry in the Dutch Indies. — *La Quinzaine Coloniale*. Paris, No. 19, 1910.

Dutch East
Indies.
Java

The utilisation of rice-straw, and of the wood of *Albizzia moluccana* is considered from the point of view of the paper-industry.

Java at present produces about 100 000 000 *piculs* (2) of rice straw per year, the value of which varies from 4.50 to 5.50 florins per ton of 1000 kilograms. It is possible to obtain 45 % of dry paper from the mass of straw

(1) A *koku* is equal to 4.96 English bushels, or 182 litres. [Ed.].

(2) A *picul* is equal to about 60 kilogr. [Ed.].

worked by the soda process; but out of the stubble-straw, remaining on the fields after harvest, only 32% of paper can be obtained, which moreover is more difficult to prepare.

The expenses, per 100 kilos of raw material, for the manufacture of *halfstof* (cellulose pulp), are as follows:

	Bleached Pulp. florins	Unbleached Pulp. florins
Rice straw	114	94
Straw left on the fields . .	174	133

Albizzia moluccana is a tree which grows very quickly, even on poor soils. At the end of six years, with 125 trees per *bouw* (7080 m.²) from 900 to 1000 kilos of air-dried wood are produced, the yield of unbleached paper being about 43.1%. The expense of preparing the raw material per ton is: unbleached, 60 florins; bleached, 90 florins (1).

The Soy Question. — *La Quinzaine Coloniale*, Paris, Oct. 25th, 1910.

Rich in fatty matter (15 to 18 %) and in nitrogen (about 6 %), the soy-beans play a considerable part in the food supply of China and Japan, where they take the place of meat. The soy-plant is also an excellent green manure. It constitutes a first class fodder and the soy oil-cakes are already much sought after. The oil of the soy-bean, of an agreeable taste and odour, is used in China and Manchuria for culinary purposes. In England this oil is chiefly appreciated for the manufacture of soap.

**China:
Manchuria**

Origin and Variation of the Potato.—*Revue Scientifique*, Paris, October 15, 1910, p. 502.

"The question of the origin of our cultivated potato is not yet definitely decided. It is generally admitted that it comes from a single species, *Solanum tuberosum*, originally of the Andes of Central America. The *Solanum tuberosum* is a fixed species, which has varied but little in the form of the flower since its introduction into Europe.

"It is interesting to remark that the *S. tuberosum* is no longer to be found in the wild state; in Chile, for instance, or in the Argentine Republic, only edible plants analogous to our own are found. But on the East coast of South America, in the whole of Argentina, as well as in Mexico and in Arizona, the *Solanum Commersonii* is found wild. This species in appearance differs much from our potato; its leaves are relatively small, it is almost without folioles, has white flowers, with short calycinal lobes and star-shaped

France

(1) *Albizzia moluccana*, Miq. (*Leguminosae*) Molucca Islands (Ind. Kew). [Ed.].

corolla, small tubers. abundant lenticels, very slightly marked eyes and long stolons; the tubers are very bitter, difficult to cook, they are refused even by animals.

Some years ago M. Labergerie announced that he had succeeded, by simple culture, in obtaining the abrupt transformation of the wild *Solanum Commersonii* into a variety analogous in all points to our common potato.

This variation appeared so remarkable that several botanists in different countries have repeated M. Labergerie's experiments, and have confirmed them. But as some botanists, as Wittmack of Berlin, did not succeed in transforming *Solanum Commersonii*, it became desirable to renew the investigations. M. Louis Planchon, of the Montpellier University, has published an interesting work on the subject, with numerous photographs and plates (*Annales de la Faculté des Sciences de Marseille*, t. XVIII, fasc. 1), where the fact is confirmed of the abrupt and direct change (in starting from the primitive type) of the *S. Commersonii* into the *S. tuberosum*.

M. Planchon has cultivated some tubers of the well defined wild type of *S. Commersonii*. Although cultivated in a sufficiently manured and well watered soil (conditions recommended by M. Labergerie), these tubers did not present any modification during the first four years of cultivation. In 1908, the tubers underwent a rapid transformation, and in the following year the change appeared evident. The wild plant, M. Planchon found, had varied to two distinct types; the first as yet but little differentiated, but presenting undoubted signs of variation (this is the half wild, or half varied type); the second type is entirely transformed. Since then, the characteristics of the two plants are perfectly homogeneous and distinct. The changed type is absolutely analogous, as to carriage, leaves, flowers, etc., to the *Solanum tuberosum*; the tubers have totally lost their bitterness, and, according to the unanimous opinion of the persons who have been consulted, their taste is excellent, and superior to that of most market varieties.

M. Planchon asks why this change, obtained within the course of a few months' cultivation, should not have been produced gradually throughout indefinite time. It seems likely that at some indeterminate epoch the *Solanum tuberosum* has issued, as a sport, from the *Solanum Commersonii*, acquiring afterwards fixity of type, just as is seen in some varieties formed at the present day.

After the first chief variation, secondary variations have brought into being the many varieties of the cultivated potato.

M. GEORGE TAYLOR. **The Cross-fertilisation of the Potato.**—*The Gardeners' Chronicle*, No. 3642, p. 279. London, October 15, 1910.

Great
Britain

The *Factor* variety of potatoes is not fertilised by its own pollen, nor by that of the most closely allied varieties.

But if it is crossed with potatoes having coloured tubers and white flowers crosses are obtained which yield heavy crops.

A. BOISIOT. **Observations in Argentina on Potato-planting.** (Consejos sobre la plantacion de las papas: Republica Argentina). — *Revista de la Sociedad Rural de Cordoba*. Cordoban, July 1910. N° 229-230. pp. 5766-5768.

In planting potatoes when half tubers cut lengthwise are used, the tubers should be prepared some days before being planted, in order that the cut surface may be well dried. Tubers which have been freshly cut deteriorate easily when they are planted, producing weak plants.

Argentina

Amongst the varieties recommended, from the point of view of richness in starch and for the feeding of cattle, the following are mentioned:

Institut-Beauvais, *Richter's Imperator*, *Gigante azul*, *Maravillo de America*, etc.

The following are recommended for the table: *Bella de Julio*, *Early Rose*, *Amarilla de Hollanda*, etc.

Certain new varieties are also praised, such as: *Professor Wohltmann*, *Président Krüger*, *Silecia*, etc.

PFISTERER. **Potato-drying Industry in Germany.** (Die Kartoffeltrocknung in Deutschland). — *Mitteilungen der Fachberichterstatte des k. k. Ackerbauministeriums*. Wien, 6-7 Oct., 1910.

The new German law (1909) on spirits, and the Socialist boycott of alcohol in Germany have affected not only distilleries, but also, and strongly, the agricultural production of potatoes. The potato crop in Germany, in 1908, was 465 000 000 metric quintals, utilised in the following way:

Germany

130 000 000	quintals	for food;
15 000 000	„	for the manufacture of starch;
25 000 000	„	for the alcohol industry;
55 000 000	„	for sowing;
190 000 000	„	for cattle feeding.

There remain 50 millions qs. which were destroyed by frost, by rotting, etc.

To avoid this loss and diminish the importation of cattle-feeds the potato-drying industry is being developed. There already exist 300 establishments, which are able to treat from 5 to 6 million quintals of fresh potatoes. The plant of a potato-drying factory does not cost more than 71 000 marks (88 750 frs.). This utilisation of potatoes is giving satisfactory results.

Cassava Culture in Surinam.—*La Quinzaine Coloniale*. Paris, N° 19, 1910.

Dutch
Guiana:
Government
of Surinam

For some years past the cultivation of indigenous and of imported varieties of Cassava (*Manihot utilissima*) has been methodically carried out by the Department of Agriculture of Surinam. Native varieties of Guiana have in general given the best returns. Only one foreign variety, originally from Antigua, has given a yield which is comparable to that of the best varieties of Surinam. Good native crops yielded from 8460 to 15 670 kilos per acre. The best of the Antigua varieties, the *White Top*, has furnished 10068 kilos. The varieties of Colombia have not exceeded 5980 kilos per acre.

New Zealand Experiments with Grass Crops.—*Journal of the New Zealand Dept. of Agriculture*, vol. 1, No 3, August 15, 1910, p. 202-210, Wellington.

Experiments with forage grasses from Europe and other countries continue at the Government Experimental Farm at Ruakura, New Zealand.

The grasses are cultivated both on plots, and in isolated rows.

New
Zealand

Already some of the native grasses have been so much improved by cultivation as to be hardly recognisable.

The *Chloris virgata* (1) and the *Chloris Gayana* (2), imported from South Africa, where they are called *Rhodes Grass*, resist drought, and grow well on light sandy soils. They send out runners which extend rapidly and widely. The roots are superficial and easily torn up. These two species of *Chloris* however cannot stand frost, which causes their roots to remain inactive for months.

The *Phalaris commutata* (3), on the other hand, is not of much value as a summer crop; but as a winter fodder it is without rivals. The vital knot of this grass is well below the level of the soil, having nothing to fear either from grazing or mowing.

The *Paspalum dilatatum* (4), has proved useful during extremely dry seasons, but when there is other fodder the cattle neglect it.

The *Panicum* sp.? (*Giant Couch*), imported from Brazil, is the grass whose growth is the most rapid in the whole collection. It creeps over the ground, issuing roots at each knot. A single plant has produced runners

(1) *Chloris virgata* Sw. (Gramineae).

(2) *Chloris Gayana* Kunt (Gramineae).

(3) *Phalaris commutata* Roem. and Schultz; *Ph. coerulescens* Desf. (Gramineae).

(4) *Paspalum dilatatum* Poir. (Gramineae). [Ed.]

more than 3 metres long, covering a surface of 6 metres in diameter in 9 months.

The experiments and studies on forage plants are also being continued at the Experimental Farm of Moumahaki, where more than 400 species and varieties are being cultivated, mainly with the object of investigating their practical value.

T. ALVAREZ. **On the Cultivation in Uruguay of "*Lolium Temulentum* Ceptchoeton"** (1). (Un cultivo de joyo). Republica Oriental del Uruguay. — *Estudios sobre cultivos y trabajos experimentales de la division de l'Agricultura*. Montevideo, 1910, No. 5, pp. 7-10.

This note treats of a variety of the European *Lolium temulentum*. This rye-grass is said to be of value as a [forage for its [richness in digestible carbohydrates, for early ripening and for productiveness.

Uruguay

According to analyses at the Experiment Station of Toledo, Uruguay, the chemical composition of the air-dried forage of *Lolium temulentum* is the following:

Total dry matter	88.76
Water	11.24
	100.00
Ash	7.91
Organic matter	80.85
Water	11.24
	100.00
Total nitrogenous matter . .	2.80
Fats	0.83
Fibre	33.20
Carbohydrates	44.02
Ash	7.91
Water	11.24
	100.00

(1) The variety "cheptchoeton" of the *Lolium temulentum* is not to be found in the *Index Kewensis*, nor in its Supplements up to 1908.

The *Lolium temulentum* is generally considered as an injurious plant, particularly when the seeds ripen in the midst of corn crops. It seems that the harmful action is not due to the sound grains of *Lolium temulentum*, but to the grains which are infested with some fungus. The interest of the present article lies in the fact that an attempt is being made to employ the *Lolium temulentum* as a forage crop. Generally all Rye-grasses are good forage crops. [Ed.].

At the experimental field of Toledo, *Lolium temulentum* was grown also on a clayey soil, the best adapted for this kind of Rye-grass. It was sown in June, at the rate of 111 kilos of seed per hectare. The grass was mowed in November, and yielded 2687 kilos of hay per hectare.

EUGENE FAU. **Furze as Forage.** (Is Furze likely to provoke Haematuria amongst Horses and sporadic Abortion amongst Cows?).—*L'Industrie laitière*. Paris, October 16th, 1910, 35th year, No. 42, pp. 677-679.

Furze (1) should be considered as the "golden plant" of poor and non-cultivated lands. Furze when used as forage never causes haematuria in horses, as has been suspected, the urine simply being reddened by a special, harmless principle which is eliminated through the kidneys. As to abortion amongst cows, it should be attributed to the preparation rather than to the nature of furze-fodder.

France

The furze should be well crushed, and a greater quantity should never be prepared than that for daily use, in order to avoid toxin-producing fermentations.

CHARLES J. BRAND and L. R. WALDRON. **Protecting Alfalfa, or Lucerne, against Cold.** U. S. Dept. of Agriculture, Bur. of Plant Industry. *Bulletin*, No. 185. Washington, Gov. Print Off., Sept. 16th 1910, p. 69.

Observations made during four years at Dickinson (North Dakota) and for more than one year in other regions of the North West of the United States, show that the conditions for success in alfalfa—or lucerne—culture in the North West of the United States, and in soils of average fertility are: deep ploughing, the employment of good seed and the character of the winter season.

United
States:
North
Dakota

In North Dakota the atmospheric conditions most injurious to lucerne were:

1. Snow fall insufficient to cover the plants, or the uncovering of the herbage when snow is wind-drifted. The drifting away of snow may be prevented by cutting the alfalfa early enough for the plants to be 8 or 10 inches high before the cold season, so that the snow may be retained by the herbage.

2. A succession of frosts and thaws which may kill the plants, either by disintegrating the tissues or by upheaving the soil.

(1) *Ulex Europaeus* L. There are several kinds of furze that can be cultivated or utilised. The French original names generally *ajonc*. [*Ed.*].

3. An excess of moisture in autumn, by which the vegetable tissues remain tender and susceptible to frost.

F. VALLESE and O. MANETTI. **Berseem (*Trifolium alexandrinum*) cultivated near Otranto, in Italy.** (Il trifoglio alessandrino o *bersim* in Terra d'Otranto). — *L'Agricoltura coloniale*. Firenze, Sept. 1910.

Ferd. Vallese has cultivated four varieties of *berseem* in Puglia (Terra d'Otranto), in poor, friable, calcareous and deep soil.

Berseem, or Egyptian Clover, gives from 3 to 4 cuttings. The average crops, are 400 quintals of green forage, besides 300 kilos of seed, per hectare.

The seed was sown in September. The crops were much superior, under equal conditions of cultivation, to those of fenugreek, vetches and red clover. The introduction of *berseem* in the more arid parts of South Italy is recommended.

Italy:
Puglia

ALB. B. **Struggle for Life in Pastures, under the Influence of Manures and of Climate.** — *Revue Scientifique*. Paris, October 22nd, 1910, p. 534.

In this summary of interesting studies by M. Emile Mer, published in the *Journal d'Agriculture pratique* (Paris, 1910, Tome I, pp. 621-656; T. II, p. 33), the results are given of 30 years' observations. The competition among grasses in the meadows of the Upper Vosges presents four principal aspects:

1. It is almost non-existent in permanent uncultivated pastures. The flora there is uniform, having but slightly varied;

2. Under culture the hardy species of meadow plants give place to more exacting kinds, the hardy plants tending to disappear, or become less hardy, under the influence of manure and of climate;

3. By rich manuring, new plants, still more exacting and of more rapid growth, mix with the preceding ones and dispute the ground with them; these are principally the Gramineae, giving more abundant but coarser hay than from the herbage of an average cultivated meadow;

4. When the soil has become too rich, either rapidly or by successive stages, the competition of certain species of large foliated plants increases to such a point that they oust the grasses and other meadow plants, remaining the chief masters of the ground.

The flora of a meadow may be so modified by manuring during a few years' as to become unrecognisable; but a shorter period is sufficient, by the suppression of all manuring, to cause the return to the primitive flora.

France

- J. SUTER. **Grass Crops in the Sub-Alpine Regions (Hügelland) of Central and North West Switzerland.** (Die reine Graswirtschaft in der Hügelland-region der Nordost und Zentralschweizerischen Alpenfussländer). — *Landwirtschaftliche Jahrbücher. Zeitschrift für wissenschaftliche Landwirtschaft u. s. w.* B. XXXIX, H. 4/5, pp. 487-612. Berlin, 1910.

The following are the conclusions on the different systems of cultivation to be adopted for Sub-Alpine regions, in the Hügelland of Switzerland in particular:

Switzerland

1) It is advisable to substitute clover for grass where the rainfall does not exceed 120-130 cm. per year, in places where cattle is kept in stables during summer and where the soil can be easily ploughed.

2) When the annual rainfall approaches 130 cm., where the slope of the ground is marked, the soil poor in lime, or wet, or stony, or too clayey, the land should be left in grass.

Pastures may be associated with the culture of corn-crops and with green crops in a measure depending on the possibilities of ploughing, on the rainfall and on prevailing temperatures.

3) Grazing is generally advisable:

- a) with low soil values;
- b) with difficult tillage conditions;
- c) with undivided farms;
- d) where the land is not favourably exposed;
- e) when rainfall is heavy;
- f) when litter for cattle is scarce;
- g) when the aim is to breed sound and profitable cattle;
- h) when the chief products are milk and cheese.

4) When the climatic conditions permit, it is advisable to associate as far as possible the culture of fruit-trees with grassland.

- M. C. DUSSERRE. **Potassic Fertilisers on Grass-Lands.** (Ueber die Wiesendüngung mit Kalisalzen).—*Jahresversam. d. Schweiz. Verein analyt. Chemiker in Glarus*; 1910; *Chemiker Zeitung*, J. XXXIV, n. 117, p. 1040, Cöthen, October, 1910.

Switzerland

In the *Manuring of Meadow Lands*, published this year, M. Wagner establishes a relationship between the potash contents of the crops and the employment of potassic fertilisers. He also determines the limits beyond which the application of such fertilisers is no longer advantageous.

By comparing these data with the results of experiments in the West of Switzerland, the fact has been verified that they are not in general applicable to the conditions of soil and climate in that region.

Ash-analysis does not permit of any conclusion being drawn as to the necessity of using potassic fertilisers, except in extreme cases, when the potash contents of the crops are very high or very low. Usually recourse to practical experiments is desirable.

These observations once more prove that the conclusions drawn from soil-analyses and from the examination of the products obtained have only a relative value in determining the needs of a soil.

G. SPAMPANI. **Alpine Pastures.**—*Cultura montana con speciale riguardo all'apicoltura.* Milano, U. Hoepli, pp. VII + 424 and 171.

This Manual contains theoretic and practical information from the point of view of harmonising sylviculture with the other cultures in mountainous districts, especially where cattle breeding and other farming industries may be developed.

The subject is treated in fourteen chapters. First of all the physiography is given, of the principal Alpine and Apennine regions of Italy. Then follows information on the climate and on the management of forests. The Author finally treats of alpiculture properly so-called.

Italy

Official statistics, not of recent date, show that there exist in Italy nearly 3 million hectares of grass-land and pastures; $\frac{2}{3}$ of this grazing land is in the higher mountain region, where no care or culture is given to the soil.

The area of this pasture-land is almost equal in extent to the wheat-area in Italy. It will therefore be easily understood how vastly important it would be to increase the present exceedingly low returns from these lands: returns which vary from a minimum of 5 quintals of hay per hectare, in the districts of Brescia and Belluno, to a maximum of 40 quintals in the district of Verona.

The production of mountain grassland could be increased or improved:

1) By modifying the flora and introducing good grasses and other forage-plants;

2) by better protecting pasture-land against deterioration;

3) by more careful culture;

4) by using fertilisers;

5) by planting trees to protect the grassland;

6) by irrigation, where possible.

The following chapters treat of permanent pastures and of planting them with trees. The author combats the opinion that trees are injurious to grassland. The book deals also with temporary forage crops; with the mountain and dairy cattle industries; with the question of shelters and of the maintainance of mountain roads; with upland irrigation, finally, with the measures taken by the Italian State for Alpine agricultural development.

Experiments on Stacked Hay in England.—(*Journ. S. East Agric. Coll.* n. 18, 1909); *Journ. Bd. of Agriculture*; vol. XIV, n. 7, October, 1910, London.

Some experiments have been made to determine the loss of weight by the fermentation that hay undergoes in the stack.

Great
Britain

Three sacks, each containing 50 lbs (22.65 kgs) of new hay were placed at different heights in a stack. During the winter they were taken out and weighed, and it was found that they lost 16 % of their original weight.

The internal temperature of the stacked hay was also verified. The new hay attains its highest temperature within about a week after stacking. The highest temperatures observed were 60° and 62° C. The rising and falling of the temperature was rapid, attaining 13°.8 C. in 24 hours. It was also observed that within three weeks after stacking the hay set up a secondary fermentation. This after-heating is peculiarly dangerous, from the point of view of causing a fire; because the hay gets heated when very dry, having lost most of its moisture during the first fermentation.

I.. MALPEAUX. **Preservation of Sugar-beet Pulps by Lactic Ferments.** — *L'Agronome*. Namur, October 18, 1910, No 41, p. 336-339.

France

This is a report to the General Council of the Pas-de-Calais department, in France, on the *Lacto pulpe* ferment, prepared by M. Bouillant. The Sugar-beet pulps stored in a silo lose any bad odour, acquiring and retaining a wholesome smell, even after a storage of 8 months.

The fattening of animals fed with this pulp has been hastened by nearly three weeks.

The influence of the ferment is seen by the small loss in gross weight and in dry matter. The acidity of the pulp is not very high and its composition varies but little. Ensilaged pulp resists the action of ferments. The advantages of the treatment are especially marked in the case of pulp ensilaged very soon after it comes out of the presses in the sugar-factory. The expense of the treatment is not over 10 centimes per ton.

A. REEVES. **Cotton Culture in the British Empire. Geography at the British Cotton Association.**—*The Geographical Journal*, London, October 1910, p. 467.

British
Empire

Mr. J. Howard Reed recently read a paper before the British Cotton Association on the cultivation of cotton in the British Empire. The contribution is of special interest for the Lancashire manufacturers.

The Author showed that the cotton crisis increases each year, because of insufficient production. Up to the present the only countries which can compare with the United States for cotton production are India and Egypt. The cultivation of cotton has made rapid progress in some other countries, where it has been introduced only recently.

Mr. Howard Reed describes the action and aim of the British Cotton Association, and indicates the countries of the British Empire offering the best conditions for cotton culture: the East Indies, Uganda, Nyasaland, Lagos and Nigeria.

This report seemed rather pessimistic as regards the future development of the cotton industry in the British Empire. On the other hand, the members of the Cotton Association recognised the importance of the question, and were glad to learn that Mr. Reeves' report is soon to be printed and widely distributed.

Cotton Cultivation in German East Africa. (Vom Baumwollbau in Deutsch Ost-Afrika).—*Deutsche Kolonial Zeitung*, October 8, 1910.

German East Africa will not be able to produce cotton of good quality and high commercial value until native cultivators are compelled to use selected seeds and of a certain type. In order to obtain this result the Government has decided that only authorities and certain specially appointed persons shall distribute cotton seeds. It is forbidden to use seeds from other sources; and cotton plantations grown from seeds produced by private persons will be destroyed. These regulations have already been applied with success by the British Government in Uganda.

German
East Afrika

H. A. TEMPANY. **Manurial Experiments with Cotton in the Leeward Islands.**—*West Indian Bulletin*, Vol. XI, No. 1, Barbadoes, 1910, pp. 60-63.

The average results of the entire series of experiments carried out during six years, comprising a great number of experiments by Mr. Tempany at St. Kitts, Nevis, Montserrat and Antigua, show that the appreciable increase in the cotton-crops is not in any case attributable to the use of fertilisers. These results are not, therefore, of a nature to modify the opinion already expressed in the preceding Report on these experiments (*West Indian Bulletin*, Vol. X, p. 273); viz., that under existing conditions in the Leeward Islands, for soil in an average state of cultivation, the use of natural or artificial fertilisers is not remunerative.

Leeward
Islands

It must not be supposed, however, that the occasional use of natural and green manures is not desirable. There are, on the contrary, reasons

for believing that periodic applications of fertilisers are indispensable for maintaining the soil in tilth and for ensuring good crops.

T. ALVAREZ. Experiments on Cotton Cultivation in Uruguay at the Toledo Experimental Station. (Un cultivo de algodono. Campo de ensayos, (Toledo).—*Republica Oriental del Uruguay, Estudios sobre cultivos, y trabajos experimentales de la Division de Agricultura*, Montevideo, 1910, No. 5, pp. 3-6.

These experiments were made with the two following herbaceous cotton varieties: *Excelsior de Moore* and *Sea Island*. The best results were obtained with the latter.

Uruguay In one of these experiments, sowing on September 8th, the plants were made to grow at a distance of 70 cm. one from the other; the harvest was on April 22nd, and yielded 751 kg., including bolls and seeds. The bolls were dried in the open air, and then weighed. The cotton fibre alone was 195 kg. per hectare, of excellent quality. It would seem that the cultivation of the herbaceous varieties of cotton ought to be advantageous, not only in Uruguay but also in the neighbouring districts of Brazil.

Cotton Cultivation in Ceylon. (Baumwollbau auf Ceylan). — *Deutsches Kolonialblatt*, Sept. 15, 1910.

Ceylon The Government of Ceylon is promoting the cultivation of cotton. The *Agricultural Society* has introduced Egyptian and Sea Island cottons in the East and in the North of the Island. But this cultivation is, at least in part, dependent on irrigation. In the Northern province alone there are 800 000 hectares admirably adapted for the cultivation of cotton, 30 000 only being devoted to the cultivation of other plants. In the face of the growing difficulties which stand in the way of the exportation of tobacco from Ceylon, it is certain that cotton cultivation will advantageously replace that of tobacco (1).

Regulations for the Buying of Cotton in Uganda. (Vorschriften für den Aufkauf vom Baumwolle).—*Deutsches Kolonialblatt*, Berlin, Sept. 1910.

The buying of cotton is permitted in Uganda, but only by special yearly authorisation of the Government. Heavy fines are inflicted on those who

(1) In 1908, the area under tobacco in Ceylon was over 14 060 acres. [Ed.]

infringe this provision. Buyers must engage to furnish information on the origin, spinning and picking of the cotton.

The aim of all these provisions is to protect the cotton cultivation in the country against defective methods.

R. W. MOORE. **Moisture in Cotton.** (American Cotton Manufacturers' Meeting, 1910).—*Textile World Record*. Vol. XL, No. 1, pp. 114-116, (85-191). Boston, Mass, October 1910.

The variation of moisture in cotton makes the question of the amount of moisture in the staple very important.

Raw cotton may absorb 30 % of moisture (when it is stored in damp warehouses, or is otherwise exposed to dampness) and this without assuming a damp appearance, or giving any sensation of moisture to the touch,

From reports already made to the Association of Cotton-growers in the United States, it appears that the moisture in cotton may exceed the quantity considered normal by 18 kgr. (36 lbs.) per bale.

Therefore it is of the highest importance that a standard should be determined to fix the amount of moisture to be considered as normal. Any excess above this limit should be held abnormal and valueless.

It has, in fact, been established that cotton when perfectly dried absorbs 8.5 % of moisture under natural and normal conditions; which is equal to saying that the normal excess of moisture over absolutely dry cotton would be 8.5 %, and the normal rate of moisture of raw cotton in the natural state would be 7.8 %.

United
States

G. S. Cultivation of Cotton and Flax in the Southern Provinces of Italy.

(La coltura del cotone e del lino nelle provincie meridionali). — *La Puglia agricola e commerciale*, n. 45, Bari, November 6, 1910.

The Italian Minister of Agriculture, Mr. Raineri, is studying the means of developing cotton culture in South Italy, and he has recently examined some projects presented by the Colonial Institute of Florence.

The cultivation of cotton in Italy which, at certain periods (as during the Civil War in the United States) gave excellent results, has since been neglected, farmers having turned their attention chiefly to the cultivation of the vine. It is desirable that attention be again given in Italy to cotton-culture. Flax is another fibre-crop, the cultivation of which ought to increase in Italy.

Italy:
Puglia

Apart from the growing importance of linseed production, (the manufacture of linseed oil and commercial derivatives), flax is as valuable as ever as a fibre.

Flax stalks are often thrown away as rubbish, after threshing the seeds; sometimes they are used for burning or for thatching. Yet, simply as producers of tow, flax-stalks may sometimes yield a profit comparable to that of the linseed.

Grove. International Flax Exhibition at Moscow. — *The Board of Trade Journal*, London, October 20, 1910.

Russia In January 1911 an Exhibition of flax cultivation and manufacture will be opened at Moscow. The Exhibition has been organised by the Russian General Industrial Society for the cultivation of flax. Exhibits will be transported free of charge to and from Moscow.

Exhibition of Fibre Plants at Surabaya in Java. (Internationaler Pflanzenfaser Congress und Ausstellung in Surabaya, 1911). — *Deutsches Kolonialblatt*, Berlin, September 15, 1910.

Dutch East Indies: Java The Agricultural Syndicate of the Dutch Indies will inaugurate at Surabaya in July, in 1911, an Exhibition of Fibre Plants.

A section of machinery for the preparation of fibres will be attached to the Exhibition. All exhibited machines not sold during the Exhibition will be returned free of freight to the ports of Genoa, Marseilles, Amsterdam and Rotterdam.

New Fibrous Plant for Java. — *La Quinzaine Coloniale*, Paris, n. 19, 1910.

Dutch East Indies: Java According to an account by M. de Kruyf on the fibres of the *Hibiscus cannabinus*, L., which has been cultivated in British India and even in Egypt, it may be concluded that the fibres obtained in Java are equal, though not superior, to good qualities of jute. *Hibiscus cannabinus* does not stand persistent and abundant rains, nor does it grow well in marshy places, nor even in soils with a humid sub-soil. Thanks to its rapid growth, this plant may be sown after the harvesting of other crops, so that by adjusting the crop-rotation it is possible to have three crops per year on the same field. This plant, wrongly named Java-jute, promises well as a crop for certain regions of Java.

Sisal-Culture. — (*Journal of the Board of Agriculture*, British Guiana, III, Jan, 3d, 1910). — *The Tropical Agriculturist*, Vol. XXXV, No 3, Sept. 1910, p. 201, Colombo.

British Guiana

It is sometimes believed that *Agave rigida*, var. *sisalana*, which produces the fibre called "Sisal," can grow and prosper in any soil and in many

climates, and it has even been said that the best fibre came from the worst Soils. But experience has shown that, to grow rapidly, Sisal-Agave needs good soil, abundant rains and careful cultivation.

The Perini Fibre Plant in Brazil.—*Bulletin of the Department of Agriculture.* Nassau, Bahamas, October 15, 1910.

The *Hibiscus radiatus* known as "Perini," produces a valuable fibre. Sown in November, it may bear as much as three crops per year. When two crops are grown, the first, a small one, is harvested for seeds, the second for fibre.

Brazil

The cultivation of *Perini* on a large scale requires the use of good machinery. "Perini" grows rapidly, attaining a height of three metres. This cultivation is in its first development in Brazil.

The Dâ Fou in Upper Senegal and on the Niger.—*Bulletin de l'Office Colonial*, Paris, No. 29, 1910.

The *Hibiscus cannabinus* L., called *Dâ Fou*, is a textile plant of the Malvaceae family, cultivated on the banks of the Niger and the Bani by the Somono people. This fibre is only produced for local use. But if the cultivation were increased, the exportation of this fibre would be very remunerative. Some experiments made in the Segou district have given the following results:

French
West
Africa:
Senegal

1st field: Rich soil, on the banks of the Niger.

Yield in dry stalks	8 400 kilos	per hectare
Yield in fibre	1 596 »	»

2nd field: Poor soil:

Yield in dry stalks	7 000 »	»
Yield in fibre	1 316 »	»

This shows that *Dâ* yields heavy crops. A hectare of land sown with *Dâ* returns about 750 francs.

The *Dâ* trade may develop; but before beginning this culture it would be well to make sure of the reception that *Dâ* fibre would meet with on the European markets ascertaining also the approximate quantity required annually by European industry.

Fibre-Trade in the German Colonies. (The Textile Trade in Germany. —*Revue des Question Scientifiques*, Louvain, October 20, 1910.

During the past few years the textile industry has made considerable progress in Germany, and the cultivation of fibre plants has developed in

Togo

German colonies, particularly cotton, which has given the most encouraging results in Togo.

Ramie, sisal and the cocoa nut fibre made their appearance in commerce after 1890; and only after 1905 Indian and New Zealand hemp came on the markets to any extent (1).

Germany imported about 800 000 tons of fibres in 1909. The figures of German Colonial importation are not high, but they are continually and regularly increasing.

Piassava Palms in Madagascar. — *La Quinzaine Coloniale*, Paris, No. 18, 1910.

Madagascar

It is known that a fibre palm, the *Dictyosperma fibrosum* (2), is cultivated in East Madagascar. Messrs Jumelle and Perrier de la Bathie have found in West Madagascar a species also capable of culture; they consider it to belong to the species *Vonitra*, Beccari, and describe it under the name of *Vonitra crinita* (3).

This palm tree yields a minimum of 3 kilograms of piassava. The industrial value of the fibre, which may be extracted either from the sheaths of the leaves or from the spathes, is not yet ascertained.

Sugar-Plants and the Production of Sugar. — *Revue des Questions Scientifiques*, Louvain, October 20, 1910.

The total sugar yield of the sugar cane (*Saccharum officinarum*) in 1908 was about 5 161 000 tons; the production of beet-sugar appears to have been 6 527 800 tons.

World
Production

Java, with Cuba, produces most of the cane-sugar, and the greatest producer of beet-sugar is Germany.

The production of maple-sugar in North America has greatly increased, but there is no hope of its extending greatly. It is the same with palm sugar (India and Java). Other sugar-plants are:

The Sorghos, in East Africa.

Maize, in Africa and America.

Panicum, in West and Central Africa.

Panicum Burgu, in West and Central Africa.

The sugar of Pineapples and Agaves is not used for industrial purposes.

(1) In England cocoa nut fibre, or coir, attained commercial importance shortly after 1850, whilst no less than 18 000 000 lbs of sisal were sent to British ports in 1875. SIR G. WATT, *The Economic Products of India*, Calcutta 1889. [Ed.].

(2) *Dictyosperma fibrosum* C. H. Wright, Madag. (*Index Kew*) [Ed.].

(3) The *Index Kewensis* and its Supplements up to 1908 make no mention of the species *Vonitra*. [Ed.].

S. STEIN. **The Cultivation of Sugar Beets in England.** (Zuckerrübenkultur und Rübenzuckergewinnung in England).—*Chem. Zeitung*. Cöthen, October, 1910, No. 124, p. 1110.

Twenty years ago the writer experimented in several districts of England, Scotland and Ireland, with 36 different varieties of sugar-beets. 39 tons 5 cwt. were obtained per acre (98 596 kg. per hectare). The amount of sugar in the beets varied from 17.65 to 21 %.

According to Mr. Stein, the climate of England is well adapted to the cultivation of beets.

Great
Britain

The Cultivation of Sugar Beets in Hawaii.—*Zeitschrift für angewandte Chemie*. J. XXIII, H. 42, p. 1986, Leipzig, October 21, 1910.

Beet-sugar will shortly be produced in Hawaii, in addition to cane-sugar.

A Company has been started at Honolulu, with a capital of 400 000 dollars (2 060 000 frs.), for the cultivation of sugar beets in the Island of Lanai. The Company also farms and breeds live-stock. Experiments show that the beets raised are very rich in sugar.

Hawaii

On account of drought, Lanai Island has not been cultivated for many years; but it is hoped that, with artificial irrigation, 60 000 tons of sugar may be produced.

MOSER. **Production of Moka-Coffee.**—*American Grocer*, New York, October 12, 1910.

Moka coffee is all grown in the Yemen, on a limited area, but it could be grown also in the hilly regions of the interior. Arabia does not produce much coffee for commerce, and sorghum, or durra, is raised on soils well adapted for coffee. The cultivation of this plant is continually diminishing. The districts where coffee is most cultivated are those between Tair, Ibb, Yerim and Sanaa. The country along the route from Hodeida to Sanaa is generally well cultivated. The best qualities of Moka are *Mohtari*, *Sharah*, *Menakha* and *Hifash*.

Arabia:
Yemen

Selection and Hybridisation of Coffee in Southern India.—*The Indian Agriculturist*, Vol. XXXV, No. 9, pp. 271-272. Calcutta, 1st September 1910.

At the annual meeting of the United Planter's Association the present status of coffee plantations in Southern India was brought up for discussion. The situation is becoming more critical year by year, on account of the low yields obtained, the quality of the product, and the spread of

British
India:
Southern
India

disease. Mr. J. G. Hamilton communicated to the meeting some results he obtained by hybridisation and selection. By crossing the common Arabian coffee with Liberian coffee, in suitable proportions, a type can be obtained which offers great resistance to *Hemileia vastatrix*, without deteriorating the quality of the product.

Mr. C. Danvers expressed doubts as to the effects of hybridisation, which he believes to be too lengthy and uncertain in its results; he would be more in favour of the introduction of new types, such as the *Robusta*.

Mr. Lampard referred to the discovery of indigenous types of coffee in the forests of the Congo; experiments have shown that these varieties yield 2 cwts. per acre.

Congo Coffee and Investigations on Rubber-culture. — (*Bulletin of the Federated Malay States*). *Nature*, No 2138, vol. 84, October 20, 1910, p. 510, London.

Federated
Malay
States

Amongst the crops which it is proposed to associate with the rubber plant during the years before it enters into full production, a Bulletin of the Department of Agriculture of the Federated Malay States suggests *Coffea robusta*, of which it enumerates the advantages.

This plant, which grows wild in the Congo, was discovered in 1898. It grows more rapidly and produces more than the *C. liberica*. When associated with rubber-plants it begins to produce at two years, and at three yields already a good crop. At five years *Coffea robusta* would damage the rubber, and must be suppressed.

Abortion in the Flowers of the Arabian Coffee Plant. — *La Quinzaine Coloniale*, Paris, No 18, 1910.

Guadeloupe

Abortion in the flowers of the Arabian coffee plant is attributed to excessive shade and perhaps also to the unwise use of manure. The coffee plantations in Guadeloupe are scarcely shaded, and only by direct experiment can the suitable degree of shade be determined. An attempt should be made in Tonkin to plant the Arabian coffee plant in full sunlight.

The Introduction of a New Coffee Plant in Madagascar. — *Revue de Madagascar*, Paris, October 15, 1910.

Madagascar

Mr. Fauchère, Inspector of Agriculture, after numerous trials, confirms that the Congo coffee plant seems able to resist *Hemileia vastatrix*, which decimates the plantations of Madagascar. Its product is superior to that of the Liberia coffee, and its yield is nearly double. These considerations recommend the Congo coffee-plant to the attention of planters.

F. PETCH. Tea and Hevea interplanted. Imports of Tea Seeds in Ceylon.

—*Tropical Agriculturist*, vol. XXXV, No. 3, Sept., 1910, p. 207. Colombo.

In Ceylon, both in the low country and on the hills, *Hevea* has been grown with tea without diminishing the yield of tea.

The tea and *Hevea* plantations occupy at present nearly 75 000 acres, or 30 000 hectares; but as the greater part of this land lies on the hills, where the growth of the *Hevea* is slow, the tea plant will suffer little damage by interplantation for many other years.

Ceylon

Whilst the statistics from 1900 to 1906 show that the exports of tea-seeds nearly balanced the imports, the sum of those from 1907 to 1909 shows an excess of imports over exports of 3506 cwt (1780 quintals), a quantity sufficient for planting about 14 000 acres, or 6000 hectares, exclusive of tea-seed produced in the island.

Tea in Java during recent Years. — *La Quinzaine Coloniale*. Oct. 25, 1910.

The area in Java under tea has greatly increased in the last few years. The production, which in 1905 was about 11 704 162 kg., had risen in 1909 to 16 672 274 kg.

The Government of Java is actively promoting tea plantations, and is studying the diseases of tea, especially those which may be introduced with the seeds. Amongst these is the well known *Blister Blight*, which may be prevented by immersing the seeds in a $\frac{1}{1000}$ solution of corrosive sublimate, sufficient to kill the germs of the fungus (1).

Dutch
East
Indies:
Java**A. FREDHOLM. Improvement of Cacao Culture by Selection, at Barbados.**—*Proc. Agricultural Society of Trinidad and Tobago. Agricultural News*, Vol. IX, No. 220, Barbados, October 1, 1910, p. 305.

To improve the cultivation of cacao in the West Indies it is necessary to select the varieties. Interplanting of different varieties is injurious to the uniformity of the product; the varieties should be studied, choosing only the best. The aim must be the production of a superior quality and a uniform type of cacao.

Barbados

Profit in Manuring Cacao Trees in Grenada, W. I. *Tropical Life*. Vol. VI, No. 10, pp. 186-7. London, October, 1910.

Though there has been no considerable increase in cacao-tree area in the Island of Grenada, the exports have risen very considerably.

Windward
Islands:
Grenada

(1) "Blister Blight of tea-plant is due to *Exobasidium vexans* (Massee). This disease is described by Sir George Watt as "one of the very worst blights on tea..." The foliage is the part principally attacked, although young shoots are also sometimes infected." *Vide MASSEE, Kew Bulletin*, 1898, p. 109; WATT, *The Pests and Blights of the Tea Plant*, p. 419.

GEO. MASSEE, *Diseases of Cultivated Plants and Trees*. London, 1910, p. 402. [Ed.].

This is due to the increased practice of chemical manuring, which, according to Mr. Malins-Smith, increases the yield by more than 7 bags in the three crops obtained per acre (1). As the average value of a bag is £ 4 and the cost of manuring £ 5 per acre, the net profit realised is £ 23.

It has, moreover, been observed that cacao trees, when well manured, develop surface roots in preference to deep roots, avoiding clay sub-soils, which prove fatal to this culture.

Cacao in the German Colonies.—*Agriculture Pr. des Pays chauds*, Paris, Sept. 1910, No. 90, pp. 253-254.

Kamerun
and Samoa

The cacao planters in the German Colonies complain that their products must seek foreign markets.

The *Deutsche Kolonialzeitung* gives the area and yield of German cacao plantations. Non-German plantations prevail in the German possessions of Kamerun and Samoa. Several recent plantations are now beginning to yield (2).

TH. SCHLOESING *Fils*. **The Cultivation of Tobacco for the Production of Nicotine.**—*Bull. des Séances de la Soc. Nat. d'Agr. de France*, Paris, July 1910, No. 7, pp. 596-603.

The growing use of nicotine in agriculture for destroying 'parasites has induced M. Schloesing to consider the advantages of cultivating tobacco for nicotine.

Experiments have been made in France under two different climates; in Ille-et-Vilaine (with variety *Auriac*) and in Lot (with variety *Nykerka*).

The cultures were carried out on plots of one *are*, (100 sq. meters) the number of plants on each plot being in the proportions of 10 000, 20 000, 40 000 and 80 000 per hectare.

It appears that in every case the quantity of nicotine produced per hectare diminishes considerably when all the leaves are left on the plants and the soil is unmanured.

In the tobacco cultivations in the department of Ille-et-Vilaine the best results were obtained by leaving from 6 to 12 leaves per plant and fertilising with 300 kgr. of sodium nitrate per hectare; or by leaving only 6 leaves on each plant and using 800 kgr. of nitrate.

The highest yield in alkaloid was from *Nykerka* tobacco, leaving six leaves per plant.

(1) M. Wildeman (*Les Plantes Tropicales de grande culture*, Bruxelles-Paris, 1908), states that the weight of a bag of cacao in Trinidad is 90 kgs. [*Ed.*].

(2) In Kamerun, in 1908-1909, the Cacao-plantations occupied 7578 hectares [*Ed.*].

France:
Ille-et-Vilaine,
Lot

Sowing the plants close together has exercised less influence on the total yield of nicotine per hectare than the number of leaves left per plant. Abundant manuring with nitrate does not appear to increase very greatly the percentage of alkaloid in the tobacco leaves.

Experiments in Tobacco-Culture in Long Island, Bahamas. *Bulletin of the Department of Agriculture.* Nassau, N. P. Bahamas, Sept. 1910.

The cultivation of tobacco, which has been introduced into Long Island in the Bahamas, has suffered in the neighbourhood of Clarence Town, first from floods and then from drought.

Bahamas

About 400 lbs. of leaves were gathered on $\frac{3}{4}$ of an acre. The soil around Clarence Town is well adapted for the cultivation of tobacco, and in normal seasons good crops may be realised.

Nicotine Manufacture in German East Africa. — *De Indische Mercur*, August 23. *The Chemist and Druggist*, N. 1601, vol. LXXVII, Oct. 1, 1910, p. 40. London.

A nicotine-factory has been erected in German East Africa. In South Africa and in Australia tobacco juice is very much used for sheep-dips.

**German
East
Africa**

The tobacco of East Africa, very rich in nicotine, is rendered lighter and more adapted to European taste by having some of the nicotine removed.

Turkish Tobacco in Cape Colony. (Der Anbau von Türkischem Tabak in der Kap Kolonie). *Deutsches Kolonialblatt*. Berlin, Sept. 1910.

For several years Boer Tobacco has been cultivated in Cape Colony, giving average crops of about 5 000 000 lbs.

In consequence of some chance experiments, by a foreigner named Stella, controlled since by successive cultivation, the Turkish tobacco *Suluk* is being introduced into the two districts of Riversdale and Mosselbay. Hitherto results have not been sufficiently satisfactory,

**South
African
Union:
Cape Colony**

Turkish tobacco is appreciated in Europe; but European consumers, on account of price, prefer tobacco produced by countries that are nearer than South Africa. Nevertheless, the success of Turkish tobacco culture in Cape Colony is not doubtful, and the South African Government is determined to favour this production.

AUG. CHEVALIER. **The Flora of Upper Dahomey. The Kola-nut Trade.** (Mission of Mr. Aug. Chevalier in French West Africa). — *La Géographie*. Paris, Oct. 15, 1910, XXII, N. 4, pp. 264-65.

French
West
Africa:
Dahomey

Djougou, or Jugu, is a very important commercial centre. It is on the way of the Hausa caravans seeking Kola-nuts in Ashanti for trade in Kano, Sokoto and even Bornu. About 15 000 cargoes of Kolanuts pass through Jugu every year, each of 30 kgr. weight.

The Hausa when on their out-journey to purchase Kola-nuts, barter the following products of their country: tanned leather, native cotton or cotton cloth, onions, mats, straw-hats, etc.

NEUMANN. **Hop-valuation in Germany.** (Oktobertagung der Versuchs- und Lehranstalt für Brauerei, in Berlin. 1910. Sitzung der Rohstoffabteilung). — *Tagez. f. Brauerei*, VIII J., Nos. 239-1274. Berlin, Oct. 12th, 1910.

The preservative, anti-germinative and bitter qualities of hops are due to the proportion of bitter principles, or *lupulin*.

Germany

It has been recently observed that of the three different substances constituting lupulin, two only should be taken into consideration: the *humulone* and the *lupulinic acid*, constituting the soft resin; the remaining hard resin is of no value.

Hops may therefore be valued by marking with points, in the following manner: 5 points for hops with less than 8% of bitter principles; 7 points when the proportion is from 8 to 10%; 9 points when from 10 to 12%; 11 points from 12 to 14%; 13 points from 14 to 16%; 15 points when the bitter principles are above 16%. The maximum recorded percentage of bitter principles was 17.3%, the minimum 9%; the general average is from 13 to 15%.

At the XVIIth Exhibition of Barley and Hops, held this year in Berlin, the following prizes were awarded, according to the described method of classification, out of a total of 134 samples exhibited: 14 First Prizes; 19 Second Prizes; 30 Third Prizes, and 4 Certificates. The German production carried off 4750 marks in prizes; the Hallertau production was particularly noted.

LOUIS GAY-LUGNY. **Pepper Production in Indo-China.** — *Commerce intérieur de l'Indochine*. Paris, Emile Larose, Ed., 1910, pp. 30-31.

French
Indochina

It is necessary to limit or even to reduce the production of pepper in Indo-China. This commodity has its market in France, where the demand varies between 2800 and 2900 tons per year, whereas the supply oscillates between 4000 and 5000 tons.

Clove Crops in Zanzibar and Pemba. (Nelkenernte in Zanzibar und Pemba).

— *Deutsches Colonialblatt*. Berlin, Sept. 15th, 1910.

The clove crop this year is below the average in Pemba, and normal at Zanzibar. On the whole there is a shortage of 65% on the preceding crop.

Zanzibar
and Pemba

The cloves gathered in Zanzibar in 1908-09 amounted to 175 743 *frasilah* (*frasilah* = 35 lbs.) and those in Pemba to 449 685 *frasilah*, whereas only 109 683 were gathered in Zanzibar this year, and 300 042 in Pemba.

E. G. CAMUS and A. CAMUS. **The Priprioca, a Perfume Plant: *Mespilodaphne pretiosa*.**—*Bull. Scient. et indust. de la Maison Roure Bertrand*. Grasse, Oct. 1910, pp. 3-22.

The leaves of this plant when bruised give off an agreeable but complex perfume, recalling clove, cinnamon and bergamot at the same time. The bark appears to be the most aromatic part of the plant, and its scent is perhaps sweeter than that of the other parts. Priprioca has been identified by Messrs Camus with the *Mespilodaphne pretiosa*, a tree growing in Brazil, in the provinces of Rio de Janeiro and Minas, in the forests of Amazonia, and in Guiana near the Orenoco. The tree has been briefly described under the names of *Pao pretiosa*, *Casca pretiosa*, and medlar-bay (*laurier nèfle*).

Brazil

The paper describing the plant is illustrated by four plates, and contains a study of the essential oils of the branches and of the wood. The *Mespilodaphne pretiosa*, almost unknown in Europe, contains in all its parts an essence which could be employed in perfumery and for soap, as a substitute for the essential oil of linaloe (1).

P. ADVISSE-DESRUISSEAU. **Ylang-Ylang (*Cananga odorata*).**—*Agr. Pr. Pays chauds*. Sept. 1910, An. X, N. 90, pp. 216-225.

This paper on Ylang-Ylang contains an historical survey of the subject, a description of the botanical characters of the plant, and some information on the cultivation, the associated cultures and the enemies of *Cananga odorata*.

Burma
Malaya

(1) * Mr Holmes (*Perfume and Essential Oil Record*, I, 1910, pag. 32) publishes an article on linaloe wood from Mexico, recapitulating all that is known on this product. According to Mr Holmes, besides *Bursera Delpechiana* Poiss. and *Bursera Aloe-xylon* Engl., which produce the Essential Oil of Linaloe, there exist in Mexico other species of *Bursera* producing aroma, such as *Bursera penicillata* Engl. and *Bursera fagaroides* Engl. var. *ventricosa*. The latter produces an aroma like caraway." Bulletin semestriel de la Maison Schimmel et Cie à Miltitz. Octobre 1910, pag. 82. [Ed.].

The Use of Caraway Stalks (Alasch) for Pasteboard—*Feuille d'informations du Ministère de l'Agriculture*. Paris, N. 38, 1910.

Several pasteboard mills in Holland have tried the use of caraway-stalks mixed with the straw of wheat, oats and barley. These stalks are relatively cheap. The results have been satisfactory; and the pasteboard manufacturers have made new purchases of caraway stalks. At present the co-operative pasteboard mills of Scheemda are experimenting this new material (1).

Netherlands

M. SOUTHCORBE. **Karité Butter**. (*Annales de Chimie analytique*, July 15th, 1910, p. 288). Abs. *Revue de Chimie Industrielle*, Sept. 1910, 21^{me} année, No. 249, Paris, p. 284.

This fat comes from the seeds of two varieties of *Spotaceae*. The nuts give both Shea butter, and Karité butter, which have the following characters:

Soudan.

Karité butter
(Soudan)

Shea butter
(Nigeria)

Nigeria

Melting point	25° to 27° C.	30° C.
Index of saponification	175.3 177	177.8 to 183
Iodine Number . . .	66 67.1	56.2 57

The Shea butter prepared by the natives contains 60% of oleic acid, 30 to 35 % of stearic acid, 3 to 4 % of lauric acid. It is thought that this at contains also some linoleic acid.

P. G. The Karité Butter Tree of Dahomey. The Doi (Voandzeia Poissoni), a Leguminous Plant with Hypogaeic Fruit. (Auguste Chevalier Mission). *Revue Scientifique*, Paris, Oct. 15th, 1910, p. 507.

"Pursuing inquiries into the agricultural and forest resources of West Africa, Mr. Auguste Chevalier, after a five months' exploration of Lower and Middle Dahomey, proceeded towards the extreme North of the country. At Nioro, in the Atacora mountains, he was busy in June with the study of *Karité*, the butter tree of West Africa (*Quinzaine Coloniale*, August 23rd, 1910). This species covers an immense area in Africa, almost entirely situated on French territory; for hundreds of kilometers the bush is nothing but an

French
West
Africa:
Dahomey

(1) Caraway or *Carum Carvi* Linn. (*Umbelliferae*). "Caraway seed is principally employed for the purpose of flavouring bread, sauces, sour-kraut, in Germany and Sweden. It enters into the composition of certain cakes, especially in that of the liqueur called *Kümmel*. It is chiefly exported from Finland and Germany, where caraway is cultivated extensively, as well as from Morocco. The essential oil is manufactured on a large scale." Cfr. DUJARDIN-BEAUMETZ and EGASSE, *Les Plantes Médicinales indigènes et exotiques*, Paris, 1889, pp. 155-156. [Ed.].

immense growth of karités, the natives utilising only a very small portion of the fruit. More than 500 000 tons of dry karité nuts could be exported annually from French African territory; and as they are worth 250 francs per ton at Hamburg, they represent a great wealth left waste. Unfortunately, the karité grows some hundreds of kilometers from the sea, in a region not yet penetrated by railways.

"Mr. Chevalier has studied a new leguminous plant with subterranean fruits, the "Doi" (*Voandzeia Poissoni*), which may be used as haricots. Europeans find Doi beans very agreeable to the taste" (1).

Doi: a New Vegetable from Dahomey.—*La Petite Revue agricole et horticole*, XVIth year, N. 379. Antibes, Sept. 25, 1910, p. 210.

The bean of the cultivated *Doi* of Dahomey, is sold in very considerable quantities on the market of Abomey, and constitutes a first class alimentary product.

The *Doi* is an annual plant, from 5 to 8 centimeters high, with a creeping stem producing numerous slender runners, which spread over the soil and are partly buried. The Doi has very small leaves.

The underground fruit, a thin wrinkled leathery pod, contains one (or two) round seeds, differently coloured, of the size of large peas. The Doi-bean may be used as the haricot, of which it resembles the best varieties.

French
West
Africa:
Dahomey

Canning Spinach in California.—*The Canner and Dried Fruit Packer*, Volume XXXI, N. 13. Chicago, Oct. 6, 1910, p. 48.

During the present season, the factories in California have canned a larger quantity of spinach than usual: 600 tons have been prepared near El Monte. This district promises an important contribution to the canning industry.

United
States:
California

GEOFFREY F. HOOPER. **The Commercial Cultivation in England of the Loganberry.** — *Journal of the Board of Agriculture*, Vol. XVII, N. 7, Oct. 1910, p. 552. London.

The Loganberry is a hybrid, or cross, of the raspberry and blackberry, obtained in California in 1881 by Judge Logan.

Great
Britain

(1) The name *Voandzeia Poissoni* is not in the *Index Kewensis* nor in its Supplements up to 1908; the *Voandzeia subterranea* Thon. is the only species named. [Ed].

The loganberry very much resembles the raspberry, but is larger and more productive; it is eaten when fresh, or in the form of syrups, jellies, jams. It is used chiefly for bottling. One firm of preservers bought in 1909, some 10 tons of loganberries for bottling.

The loganberries have been cultivated in England on a large scale for barely five years. Some growers have already five acres in full production of Loganberries, yielding as much as 4 tons of fruit per acre (or 100 quintals per hectare).

The fruit ripens from the middle of July to the end of August.

Mr. Hooper gives instructions on the subject of the cultivation of this new fruit. Loganberry is resistant to spring frosts, but is already damaged by two enemies: the *Byturus tomentosus*, or raspberry weevil, and a disease probably due to a fungus (1). No satisfactory remedy has hitherto been found either for the one or the other (2).

HENZE. **Chemical Manuring of Chrysanthemums and other Flowers.** (*Blumendüngung*). — *Die Ernährung der Pflanze*. Stassfurt, Oct. 1910, N. 20, p. 200.

Germany

Remarkable results may be obtained with Chrysanthemum plants when chemically manured. The flowers of plants fertilised with phosphates, potash salts and nitrogen have finer colours and are more developed than the flowers of plants with insufficient or no manure.

Indications are given for the manuring of Azaleas, Rhododendrons, Camellias, Orchids, etc.

S. VALLE. **Mixed Flower-culture in the Riviera.** (Osservazioni economico-agrarie sulle consociazioni dei fiori nella Riviera Ligure). — *L'Agricoltura Italiana*, Pisa, October 1910, fasc. 682, p. 577-580.

Italy: Liguria

In fields where there are no trees it is the custom on the Riviera to grow roses and carnations together, so that the rose-plantation gives some returns during the first four years, when the rose plant is of small yield.

In olive groves, where carnations cannot thrive, because requiring plenty of sunlight, the rose is cultivated during one year together with violets (*violetts touffues*), and during the next three years with the hyacinth or with the narcissus.

(1) *Byturus tomentosus* is the most injurious of all the insects which attack the raspberry. This weevil, 4 mm. in length, is known in England under the name of *Raspberry Bug*. *Text Book of Agricultural Zoology*, by FRED. W. THEOBALD, London, 1898. [Ed.].

(2) For information on the cultivation and origin of the Loganberry, see Ch. H. SHINN and F. W. CARD, in L. H. BAILEY, *Cyclopedia of American Horticulture*. New-York, 1903, vol. IV, p. 937. [Ed.].

It is certainly not advisable (as sometimes done in the Riviera) to cut down olive groves and replace them with flowers. By judicious pruning of the olive-trees, flowers may profitably be interplanted.

Floriculture associated with the cultivation of the olive tree is a peculiarity of the Eastern Riviera, where the experience of crops and ornamental plants suitable for growing with olive-trees has led to increased profits. Olive-trees and ornamental palms may be profitably grown together.

ERN. NYSSSEN. **R. Richter's "New Arboriculture" in Germany.** *Chasse et Pêche*. Brussels, Oct. 1st, 1910, p. 14-16.

Mr. Rudolph Richter, in a book entitled *Der Neue Obstbau*, published by Rudolph Just at Stapelberg am Harz (Germany), proposes a new method of tree-culture which, if practised, would revolutionise fruit tree cultivation. This method is a modification of that of Stringfellow, which is adapted to the conditions prevailing in some parts of the United States, and has given good results in Central Europe (1).

By Richter's method the soil is not specially prepared before planting, and the main branches of the tree are cut back to within 3 or 6 centimetres of their base, whilst the root is reduced by an oblique cut to a mere stump.

Germany

The tree is planted superficially, after plastering the stump with moistened clay; no props are used, Richter considering them injurious. Manure must be placed on the surface of the soil, and the earth should not be tilled superficially. No vegetables should be grown under the tree, within the radius of a metre, while the tree is young, and later on not within distances corresponding to the spread of the foliage.

(1) "Of late years a method of drastic pruning has come into notice under the name of Stringfellow or stub-root system, taking its name from H. M. Stringfellow of Texas, who has written much concerning it. The fullest presentation of Mr. Stringfellow's ideas will be found in his book "The New Horticulture." It advises that practically all the roots be cut away and that the top be shortened to a straight stick, one or two feet long, without side branches. It is the supposition that when trees are reduced to their lowest terms in this way, the new root-branches that arise will take a more natural form and the tree will assume more of the root character of a seedling. This method of transplanting has met with good success in many places. The fundamental theories on which it is founded, however, have not been demonstrated. This system is, in fact, a matter of local practice rather than of principle. In a great majority of cases, it will be found to be better, particularly in trees that are three years old or more, to prune them only moderately, allowing a part of the original root system and a part of the top to remain."

Cyclopedia of American Horticulture, L. H. BAILEY. New York, vol. III, 1907, p. 1442. [Ed.].

Mr. Richter is contrary to pruning, and to the use of poisonous insecticides; moistened clay is his sole treatment for plants and their wounds.

New methods are suggested for the cultivation of herbaceous plants, for the strawberry in particular.

L. DANIEL. **Inverse Grafting.**—*Revue Horticole*, No. 20, Paris, October 16, 1910, pp. 469-472.

France

Mr. Daniel, of the Rennes Faculty in France, describes *inverse grafting*, done with two plants, each of which may play alternatively the rôle of stock and of scion. He has tried to discover whether it were possible to make inverse grafts with any two kinds of plant and whether the two inverse grafts succeed equally and with similar results. M. Daniel has made inverse grafts of Belladonna and Potatoes, of Potatoes and Tomatoes; and after numerous trials he has come to the conclusion that the same plant behaves differently, according to whether it plays the part of stock or of scion. This tends to prove that the immutability of grafted plants is not absolute, there being a *reciprocal influence of the stock and of the scion*.

HÉRISSANT. **Pruning of Old Fruit Trees.**—*Bull. des Séances de la Soc. Nat. d'Agric. de France*, Paris, July 1910, n. 7, p. 613-615.

France

In the treatment of old or decaying fruit trees good results have been obtained by Mr. Herissant's new method of pruning off branches and twigs with a diameter under one centimetre. Secondary branches are topped at the point where they attain the same diameter, while the big branches and principal boughs remain untouched.

Experiments were made apple trees of the varieties: *Petit Doux*, *Bidan* and *Gilet Rouge*.

BAUMANN. **Propping and Binding Trees.** (Stamm-und Baumbände). — *Geisenheimer Mitt. über Obst und Gartenbau*, Geisenheim, Nov. 1910, No. 14, pp. 177-188.

Germany

A new system for binding trees to their props. The prop, driven into the ground along the tree, is fitted with a special hinged ring, the two segments of which, when properly opened, encircle the stem. Thus the tree is well supported without being hindered in its development. The segments of the ring are wrapped in cocoa-nut fibre. There are several types of rings for different plants. The rings are of galvanised iron; they last long, proving cheap in the long run.

C. WALDRON. **Windbreaks and Hedges.**—*North Dakota Agricultural College.* (Government Agricultural Experiment Station for North Dakota). Bull. No. 88, pp. 3-11.

Orchards in North Dakota are doomed to failure unless the fruit trees are sheltered against the wind by a belt of trees. The more useful plants as wind-breaks are:

Poplars (Norwegian and Carolina poplars), Maples (*Acer Negundo* and *saccharinum*), Willows (Golden Russian Willow), Elms, Ash trees, Oleasters (*Olea europea* and *Oleaster*). The Oleaster is adapted for alkali soils. Amongst Coniferae, *Pinus ponderosa* and spruce may be mentioned.

United
States:
North Dakota

In arranging windbreaks it is useful to plant the trees in several rows, for mutual protection. To avoid the injurious piling up of snow it is advisable to plant a single row of willows on the north side.

The following is a good plan: Willows to the north side; elms on the south; maples and ash trees in central alternate rows.

Viticulture in Argentina, in 1910.—*Bulletin mensuel de l'Office des Renseignements agricoles.* Paris, Sept. (Oct.), 1910.

The chief viticultural provinces of Argentina are those in the Cordillera region: San Juan, La Rioja, Catamarca and Mendoza. The *Cafayate* wines will become a source of wealth for the province of Salta when it is provided with means of transport.

Argentina

The climatic conditions of the provinces of Mendoza and San Juan are very suitable for wine production. The soil is rich, the climate dry, rains and hail very rare.

At Mendoza there are at present 48 500 hectares of vineyards, and the native vines have been substituted by good varieties: *Malbec*, *Sémillon*, *Cabernet*, *Pinot* and *Barbera*. These vines can yield 98 hectolitres to the hectare. The average yield of these European varieties is from 10 000 to 12 000 kilograms of grapes per hectare; some of them yield 40 000 kgr., producing 280 hectolitres of wine per hectare.

These remarkable yields are due to climatic conditions, to the possibility of abundant irrigation at suitable times and to the fertilising qualities of the irrigation water.

Wire Baskets for Vine-layering. (Drahtkörbe für die Anzucht von Korb-
reben von der Firma Mik. Krebs. Neumagen (Mosel).—*Mitt. über
Weinbau und Kellerwirtschaft.* Geisenheim, Oct. 1910, No. 10, pp. 151-152.

Germany

These wire baskets are 20 cm. long by 17 cm. broad. A vine branch is passed through a mesh of the basket and fixed to a prop. The

basket is then fixed in the ground at a certain depth; thus the roots which spring from the vine-layer are kept well together, within the basket. The wire of the net is so fine that eventually it rusts away in the soil, letting the roots develop freely.

A. DEMOULINS & V. VILLARD. **Further Observations on American Vines as Direct Hybrid Producers.** *Côtes du Rhône. France.*—*Progrès Agricole et Viticole.* Montpellier, No. 42, October 12th, 1910, pp. 474-481.

France:
Côtes-du-
Rhône

The writers publish an account of their tenth year of observations on a collection of direct hybrid producers in the Côtes du Rhône. They mention the more important hybrids, *Couderc*, *Seibel* and *Castel*, which have proved useful in the South, and refer to the advantages which could be derived by cultivating them along with the *Vinifera*. Lastly, they classify these hybrids according to the soils best suited to them, and according to the depth of colour of the wines they produce.

GEORGE C. HUSMANN. **Grape Investigations in the Vinifera Regions of the United States, with reference to resistant Stocks, direct Producers, and Viniferas.**—*U. S. Dept. of Agriculture. Bureau of Plant Industry.* Bull. No. 172, p. 3, Washington, August 25, 1910.

United
States:
California

This Bulletin collects the results of many experiments in vine-culture in California, with a view to high production and resistance to phylloxera.

Cuttings of the resistant varieties *Monticola*, *Berlandieri*, *Aestivalis*, *Bicotoc*, *Lincomii*, and *Candicans*, are slow in taking root. It is advisable to plant them in nurseries where they root; they are then grafted, on the spot, or in the vineyard after transplanting.

The *Riparia* possess good qualities, but they do not find in California suitable soils. The *Rupestris* is also much appreciated from several points of view, but shows scarce affinity for the *Vinifera*, which, when grafted on *Riparia*, *Berlandieri* and *Campini*, produces better and ripens sooner.

The hybrids of *Riparia* and *Rupestris*, which inherit the good qualities of both stocks, will become the types best suited to the conditions of California.

Italian Table Grapes on German Markets. (Uve da tavola sui mercati di Germania).—*Bollettino del Ministero di Agr. Ind. e Comm.*, Roma 1910, fasc. 3, series B.

Italy

Italy occupies the first place on the German market for the importation of table grapes; France and Algeria follow immediately after, Spain having only a secondary position. The first grapes of the season, which formerly

came exclusively from Italy, are now imported also from Algeria, but in small quantities. The earliest grapes arriving on German markets are from Algiers, then those from Bisceglie in Puglia, in South Italy, after which come those from North Italy and France; finally the grapes from the Abruzzi.

The packing of Italian grapes is very carefully done. Late grapes find an excellent market, provided they have been well packed in small boxes of from 2 to 5 kilograms. Late select Italian grapes might replace hothouse grapes, if only the finest varieties were chosen.

The Cultivation of Dessert Grapes in the Province of Bologna, Italy. —

Bulletin de l'Office du Gouvernement de l'Algérie. Paris, Oct. 15, 1910.

Different qualities of dessert grapes are cultivated in the province of Bologna, notably the *Chasselas* and *Negretto*. The latter variety, which has smaller berries than the *Chasselas*, is less appreciated in trade and is consumed locally.

Italy

Consignments are mostly sent to Germany, whence a part is re-exported into Holland and into Scandinavia. The quantity exported amounts to about 80 000 metric quintals.

The Raisin Industry in California. Seedless Raisins. —

Bulletin de l'Office du Gouvernement de l'Algérie, Paris, Oct. 15, 1910.

The Californian raisin is becoming more and more a valuable export article.

United
States:
California

The method employed to stone the raisins consists in the following operations:

1. Sun-drying the grape;
2. Warehousing in sacks;
3. Artificial drying, to facilitate seed-separation (stemming).

Before the extraction of the pips by a special machine, the dried raisin is softened by steaming. The berry is then ready for the machine which extracts the pips, the pips falling on one side of the machine and the raisins on the other. This machine is patented by "The United States Consolidated Raisin Company."

RAOUL BLANCARD. The Northern Limit of the Olive in the French Alps. —

La Géographie, Paris, October 15, 1910, XXII, No. 4, pp. 225-240.

Observations on changes in the northern limit of the olive in the French Alps are given. In the first part of the paper the region considered extends from the Rhône to the Durance. In no part of France does the olive reach

France

such a northern latitude as between Valence and Orange. The last olive trees of the Eygues are at Villeperdrix and Saint May; starting from the confluence of the Joulourenc and the Ouvèze, the limit suddenly turns southwards towards Malancène, attaining its most southern point at nine kilometres from Cavaillon, after rounding the plateau of Saint-Christol. The olive-trees of Bevons mark the northern limit in the Durance valley.

CHIARAMONTE. **Pickle-olives in Argentina.** — *Bulletin de l'Office du Gouvernement de l'Algérie*. Paris, October 15, 1910.

Argentina

In 1908, the olive area in the Argentine Republic was 274 hectares, with 98 265 trees. This culture is beginning to acquire some importance in the province of Mendoza. In other parts of Argentina olive trees are quite neglected. The preparation of pickled green olives is developing in the province of Mendoza, where the green olives are valued on account of their size and taste.

The province of Rioja has also acquired some importance for the production of olives for pickling. In the province of Buenos Ayres, Government is trying to encourage olive cultivation and olive-oil making.

A prize of 15 000 *pesos* is offered by law to all planters of more than 500 olive trees, and a prize of 20 000 *pesos* is awarded to the person who makes 1000 hectolitres of oil from olives gathered in the province.

MOREAU. **Olive Culture at Matmata, Tunis.** — *Bulletin de la Direction de l'Ariculture*, Tunis, 2nd quarter, 1910.

Tunis

The number of Olive-trees in the district of the Matmata, which at present amounts to at least 60 000, is increasing, yearly. The plantations are all done by natives. The restoring of old olive trees, which has given such good results in the north of the Regency, would also be of great benefit in Matmata.

As to the method of oil making, it has remained unchanged for centuries. The expense of a European oil-mill would be too great even for rich natives.

N. MINANGOIN. **Pickle-olives in Tunis.** — *Progrès agricole et horticole*. N. 44. Montpellier, 30 October 1910, pp. 547-551.

Tunis

Amongst the many varieties of olives cultivated in Tunis some are of such a size that they could well be used for pickling. But this industry has not yet developed to any extent, because the varieties that yield large berries are not cultivated in sufficient numbers by themselves, being scattered all over the territory interplanted with other varieties.

This renders the cost of picking too heavy.

According to researches made by M. Marzac, M. Minangoin has drawn up the following list of the best pickling varieties:

1. Barouni; 2. Bidh el Hammam; 3. Besbassi; 4. Tefahi; 5. Menkarer-Ragma; 6. Zarazi; 7. Vaconti; 8. Limi; 9. Marsaline; 10. Meski; 11. Nab el Djemel; 12. Regragni or Djerbouai.

Calcium Cyanamide in the Manuring of Olive Trees. — *Relazione annuale sull'attività della Cattedra ambulante di Agric.* (July 1909-June 1910). R. Istituto Sup. Agr. Sper. in Perugia; 1910, pp. 48-49.

Experiments were made both on young and old olive trees, manured with quantities of calcium cyanamide varying from a minimum of 0.5 kgr. to a maximum of 3 kgr. per tree. In some cases the fertiliser was spread over a surface corresponding to the spread of the branches, in other cases the fertiliser was buried in a furrow round the tree at a distance of 40 or 50 cm. The effect of this manuring was injurious from the beginning. The olives which had received more than 0.5 kg. of calcium cyanamide, already in August showed distinct signs of withering.

Italy:
Umbria

The leaves began to wither at the vertex, in the manner characteristic of the disease called *brusca*. This withering eventually causes the leaves to fall, the tree becoming so weakened that no fruit is produced in the following year. Calcium cyanamide is more or less injurious, according to the nature of the soil, especially in proportion to its contents in humus. Poor sandy soils are those in which calcium cyanamide is particularly harmful to the olive tree.

The Jaffa Orange. — *The Agricultural News*, vol. IX, N. 219, p. 292, Bridgetown, Barbados. September 17, 1910.

A special orange flourishes on the limestone soils of Jaffa, the fruit of which is large and free from pips. These characters distinguish the true Jaffa Orange from other types, often erroneously also called Jaffa oranges, and cultivated in Tunis, Algeria and in America. This orange tree is to be recommended for the flavour and good keeping qualities of the fruit.

Turkey:
Palestine

Citrus-fruit from Saïda in Syria. — *Bulletin de l'Office du Gouvernement de l'Algérie*. Parigi, October 25, 1910.

Saïda, a port in Syria, south of Beyrouth, is an important centre for the production and exportation of oranges and lemons. The greater part of the consignments are for Beyrouth, Damascus and the principal towns of the interior; the remainder goes to Egypt, Liverpool, Odessa, in Roumania

Turkey:
yria

and to Constantinople. The whole exportation however, does not exceed a value of 280 000 frs. The boxes of lemons contain 300 lemons and weigh 30 kg.; the orange cases contain 200 fruits and weigh 25 kgr.

"Grape fruit" Production and Trade in the United States. — *Bulletin de l'Office du Gouvernement de l'Algérie*. Paris, October 15, 1910.

United
States:
California
Florida
Texas

Besides the oranges and lemons of Florida and California, a local product is raised in the United States, called *Grape Fruit*; it resembles a large orange having a special flavour. In Texas some extensive groves of Japanese varieties of oranges have been planted.

450 000 cases of "Grape fruit" are raised in Florida; and 50 000 in Louisiana and the Mississippi delta (1).

Citrus Fruits from Vera Cruz, Mexico. — *Agriculture commerciale*, Paris, N. 18, 1910.

Mexico

To encourage the production of citrus fruits in Mexico, the Mexican Government grants a bounty of 5 frs. per 1000 oranges and 3.75 frs. per 1000 lemons exported.

The bitter orange and the lemon grow wild in abundance around Vera Cruz, where they flourish at a height of 4000 feet above sea level, bearing fruit during the greater part of the year. Wild lemon trees grow to a good size.

The exportation of oranges began in 1908.

Essence of Petitgrain in Paraguay. — *Journal of the Royal Society of Arts*. London, 1910, No. 3016, Sept. 1910, p. 934.

Paraguay

Oil of petitgrain is obtained by distillation from the leaves of the bitter orange. Neroli is obtained by distilling orange flowers, but is not produced in Paraguay, as it requires skilled labour to cause the trees to bloom regularly and abundantly. The bitter orange in the wild state is so abundant in Paraguay that the leaves can be gathered at all seasons.

From 550 to 650 lbs (1 lb = 453 grams) of leaves are required for a quart of essential oil (about a litre).

The dealers, merchants and exporters, refine, purify and filter the oil by a secret process.

(1) *Citrus decumana* L. (*Citrus pomelanus*, Hort.) comprises the varieties which in the United States are called *Pomelo*, *Pumelo*, *Shaddock*, *Grape fruit*, *Pompelmos*. The *Pomelos* or *Grape fruits*, of a round form, are commercially the most important of these varieties. *Shaddocks* are pear-shaped, and are cultivated as ornamental plants.

See: L. H. BAILEY, *Cyclopedia of American Horticulture*, New York, 1909, vol. I, pages 342.

Before purification the oil has a distinctly oily odour, while afterwards its perfume is like that of Florida Water.

It is said that small quantities of oil distilled from orange flowers are mixed with oil of petitgrain, and the mixture sold as neroli.

Oil of petitgrain is employed in perfumery, especially for toilet soaps.

PLISTERER. **The Cultivation of Fruit Trees in Germany.** (Deutscher Obstbau).

— *Mitteilungen der Fachberichterstatte des K. K. Ackerbauministeriums.*

Wien, October 1910.

The number of fruit trees in Germany in 1900 was 168 432 000. Of every 100 fruit trees, 31 are apple trees, 15 pear, 13 cherry and 41 plum trees.

The best region for fruit is the Neckar Valley in Württemberg, then come Saxe-Altenburg, Schaumburg-Lippe, Karlsruhe, Mannheim and Brandenburg.

Germany

The following are the imports of fruit in Germany:

Apples. . . .	1 871 590	quintals
Pears	431 995	»
Cherries . . .	63 391	»
Grapes. . . .	353 623	»
Nuts	193 881	»

Fruit exports do not exceed 3 per cent of the imports; they go to Switzerland, England and Denmark, and amount to:

Apples. . . .	14 022	quintals
Pears	25 148	»
Cherries . . .	30 500	»
Plums	37 097	»

The importation of dried and preserved fruits, mainly from California and Florida, exceeds 572 000 quintals.

The principal countries which export fruit to Germany are Holland, Austria-Hungary, France and Italy. Italy sends table grapes, cherries, peaches, pears and apricots.

The main supply of apples comes from Austria; Hungary sends small cooking apples. The imports from France include strawberries, pears and apricots. Servia sends plums and apples, and Russia nuts.

The total value of imported fruit is nearly 100 000 000 marks. The country which is always gaining more and more footing on the German market for price, organised communications, and Government facilities is Italy.

Sale of Fruit and Vegetables at Mannheim, Germany. — *Feuilles d'informations du Ministère de l'Agriculture*. Paris, October, 18, 1910.

Germany

Chestnuts are supplied to the Mannheim market by Italy and France, but the Italian product fetches a higher price. Nuts come from France, Italy and Servia, and oranges from Sicily and Spain (Valencia and Murcia). Lemons come from Sicily only. The greater number of apples arrives from Italy; but France, Holland and Switzerland also compete, and would do so to a greater extent if the Italian crops were insufficient. Grapes are furnished by France (white grapes from Vaucluse), Italy and Spain (Denia and Almeria).

Provence and Anjou cauliflowers are much appreciated; the importation from the South of France begins at the end of November, whereas the Italian product only arrives in December. Egypt furnishes onions, *via* Trieste. Potatoes begin to arrive in January, and the most appreciated varieties come from Malta, from Piedmont and the Neapolitan region. France and Italy export lettuces to Mannheim.

Dietetic Experiments in California with Dried Fruit fumigated with Sulphur. — *California Fruit Grower. The Canner and Dried Fruit Packer*. Chicaco, October 1910, p. 43, vol. XXXI, No 13.

United
States:
California

Twenty students of Stanford University have been selected for dietetic experiments on the effects of sulphur fumigated dried fruit on the human organism.

These experiments will be conducted under the usual conditions of dietetic experiments, and the results compared with those obtained last year at the California University.

MAIZIERES. Loquats in Sicily. (The Japanese Medlar for Exportation). — *L'Agriculture commerciale*. Paris, N. 18, 1910.

The improvements in loquat-culture have resulted in crops of large fine fruit.

Italy:
Sicily

The Algerian produce not being able to stand a long voyage, that of Sicily is in increasing request and loquat-culture has consequently grown in importance. Reed-baskets are preferred for exportation.

The medlar should be packed while still somewhat green, as it ripens well on the way. The baskets are sent to France, Switzerland and Germany.

The demand for Sicilian loquats is steadily rising, as the fruit ripens in May, when there are not yet many good fruits on European markets.

The best variety of loquat cultivated in Sicily is the Tanaka, a recent introduction from Japan.

TOTTEN. Proposed Banana-culture in Venezuela. — *Pan-American Union*.
Washington, October, 1910.

The Government of Venezuela has granted a concession to a Company, already engaged in banana culture in other parts of South America. The concession regards the cultivation of this fruit in the region South of Lake Maracaibo, a fertile and wind-sheltered district.

Venezuela

M. WINKEL. Dried Bananas. — *Journ. de Pharmacie et de Chimie*. Paris, October 16, 1910, N. 8, p. 29.

The unripe banana, when dried, contains 80 per cent of starch and only from 3 to 4 per cent of sugar. The dry ripe fruit, contains 70 per cent of sugar (40 per cent of which is saccharose and about 30 per cent inverted sugar) and only 2 per cent of starch. Sugar therefore is produced at the expense of starch, during ripening. Bananas for exportation are gathered before they are ripe, and ripen on the journey or after. These bananas have not the delicate perfume of fruit ripened on the plant.

Jamaica

Considering that 40 per cent of this fruit consists of peel, the advantage of drying them for exportation when perfectly ripe and aromatic is obvious.

Dried bananas are known under different names. They are rapidly and completely digested, and are highly nutritive. Their cheapness renders them admirably adapted for popular consumption.

Dried Bananas in Europe. — *The Canner and Dried Fruit Packer*, vol. XXXI, No. 14. Chicago, Oct. 13, 1910, p. 44. (From a Report of the U. S. Consul General, R. P. Skinner, Hambourg).

Bananas dried whole and in slices have been sold in Germany for the last two years with growing success.

So far the best dried bananas come from Jamaica, whence they are despatched in wooden boxes of 25 kilos. The average price is about 68 frs. per 100 kilos.

Jamaica

GIBSON. The Uses of the Prickly Pear. — *L'Agriculture commerciale* Paris, No 18, 1910.

Alcohol comparable to the best brandy has been extracted from the *Cactus opuntia* in Australia. From the distillation residue or mash, a cake for cattle is prepared, by mixing with several substances. Now that the raw material for cellulose pulp is giving out, paper is also prepared from the prickly pear. The latter production may become remunerative considering the present deficiency and cost of cellulose pulp from timber. Prickly pears

Australia.
United
States:
Arizona

are rich in sugar; it is said that from 2 tons of this fruit the sugar-yield may be equal to that of 3 tons of cane.

Experiments in Arizona with another species of cactus, *Echinocactus Wislizeni*, have led to the manufacture of a substitute for leather.

Canning Tropical Fruits in India. — *The Tropical Agriculturist*, Vol. XXXV, No. 3, Sept. 1910, p. 277 (Statesman, Aug. 21). Colombo, dep. 1910.

India:
Bengal.

At Murzuffarpore, in Bengal, the Bengal Preserving Company began recently to can mangoes, lichis (*Nephelium Lit-chi*) and pine-apples. The factory employed 85 hands this year and has turned out 20 000 tins. When this business is completely organised, the out-put will be 300 000 tins per annum.

Cocanut Cultivation in the Federated Malay States. — *The Board of Trade Journal*. London, No 722, 1910.

Federated
Malay
States.

The report made in 1909 by the Inspector of cocoanut plantations in the Federated Malay States shows that a total area of about 123 815 acres in the different States is under cocoanut palms. This area is distributed as follows:

Perak	63 225	acres
Selangor . . .	25 818	»
Negri-Sembilan.	19 037	»
Pahang	15 735	»

About two-thirds of this area is bearing, and the value of the whole is estimated at 25 000 000 dollars. In 1909, 5118 acres were cleared and planted, 1500 acres of this being planted by Europeans, the rest by natives.

The Avocado Pear, "Persea gratissima." — *Bulletin of the Department of Agriculture*, Nassau, Bahamas, September 1910.

West Indies:
Bahamas.
Yamaica.

The *Persea gratissima* in the West Indies produces sufficient fruit for local consumption, and if this fruit were not so delicate and difficult to transport a prosperous export industry would by now have grown up. The *Persea gratissima* is one of the most delicate fruits of the West Indies; but, when care is taken in gathering and packing, the difficulties now standing in the way of its exportation will be overcome. This is proved by two consignments, one to New York and the other to London. By proper packing, the loss was reduced to less than 2.9 per cent (1).

(1) *Persea gratissima* Gaertn. F. a Lauracea, the fruit of which in the United States is called Avocado or Alligator Pear. The Avocado is very plentiful in Jamaica.

L. H. BAILEY, *Cyclopedia of American Horticulture*, New York, 1907, Vol. III, p. 1280. [Ed.]

I. PUIG NATTINO. « *Carica Quercifolia* » or *Triguera del Monte*. — Republica Oriental de Uruguay. *Estudios sobre cultivos y trabajos experimentales de la division de agricultura*. Montevideo, 1910, N. 5, p. 11-21.

The botanical characters of this plant are described and the chemical composition of the ripe fruit is given: Uruguay

Water	84.92 %
Total dry matter.	15.18 »

Composition of the dry matter, referred to the fresh fruit:

Albuminoids	2.00 »
Fatty matter :	2.33 »
Woody Fibre	1.26 »
Ash	1.07 »
Non-nitrogenous extract . .	8.40 »

Nutritive ratio $\frac{1}{5.35}$

The chemical composition of the *Carica Papaya* L., according to an analysis by D. A. Niobay, in Brazil, is

Water	79.97 %
Fatty matter	2.50 »
Albuminoids	5.31 »
Non nitrogenous extract . .	8.16 »

A fermented drink has been prepared from the fruit of the *Carica quercifolia*, the chemical composition of which is given. It seems that the ripe fruit can also be used as food for cattle (1).

(1) The *Carica quercifolia* Solms-Laubach (also called *Vasconcellia quercifolia* St. Hil.) is a *Passifloracea*. It is a very hardy plant, with small fruit and large lanceolated leaves, containing a higher percentage of *papaine* than the *Carica Papaya* L. Papaine is much used as a vegetable pepsin. See FRANCESCHI in L. H. BAILEY, *Cyclopedia of American Horticulture*, New York, 1909, vol. I, p. 246. [Ed.]

Forestry.

C. H. FINCH. **Danish Forest-Statistics.** (These statistics, reported by the British Vice-Consul at Copenhagen, are replies to questions to the Danish Government by the Forest Department of Minnesota, U. S. A.). — *Quarterly Journal of Forestry*, October 1910. London, p. 300-305.

The area of woodlands in Denmark, according to the returns of 1907 is 810 070 acres (327 268 hectares) or 8.3 per cent of the Danish territorial area. About 200 000 acres (80 800 hectares) of this area belong to the State, 17 070 acres (6 890 hectares) to communes and 563 000 acres (239 572 hectares) are private property.

Denmark

Only 85 per cent of this area is wooded (33.4 % under beech and 41.4 % under conifers).

The State of Denmark possesses:

	Total area		Wooded area	
	Acres	Hectares	Acres	Hectares
State Forests	141 000	56 964	100 600	40 642
Parks	2 840	1 147	1 520	614
The Forests of Söro Academy .	8 580	3466	7 650	3 090
Down Plantations	53 500	31 927		

The productive area would be therefore 109 700 acres (44 347 hect.).

The soil of the country is mostly alluvial, with the exception of Bornholm Island, where granite is frequent. Of the productive area 37.6 % grows beech, 3.6 per cent oak, 5.9 per cent ash, maple, birch, elm and alder, and 52.9 per cent conifers, especially spruce (*Picea excelsa*). The Jutland heaths have been almost entirely planted with spruce and mountain pine (*Pinus montana*). The annual timber output is 225 000 cubic metres.

The State never sells standing timber, the trees being only felled by State foresters.

The total annual forestal expenditure for 1908-1909 was 1 201 495 crowns (1 658 063 frs.). This sum does not include the expenditure for the tuition of forest officials, nor expenses for experiments shared equally by the State and private owners. The annual gross revenue from 1906 to 1909 was 1 718 088 crowns. The comparatively low net return is chiefly due to the expense of afforestation of heaths belonging to the State and to the low produce of recent woodland.

Importation of Pine and Fir Seed into Sweden. — *The Journal of the Board of Agriculture*, Sept. 1910, No. 6, p. 499.

A Law dated April 4, 1910, enacts that foreign seed of all kinds of pine (*Pinus*), (with the exception of *Pinus Cembra* and *Pinus sibirica*) and all kinds of fir, *Abies*, must be imported into Sweden in sacks marked *utländskt frö* (foreign seed), the mark to be written in large letters. The act requires that imported seeds be rendered recognisable by colouration with eosine.

Sweden

Forest Administration in Rewa State, India. For 1908-1909. — *The Indian Forester*, Vol. XXXV, No. 10, Allahabad, October 1910, p. 590.

The year 1908-1909 was marked in the native State of Rewa by two important events regarding forests, the chief being the passing of a Forest Law; the other, the opening of a State factory for shellac.

British
India:
Rewa

Reservation of valuable Forests in Colombia. — *The Board of Trade Journal*, London, October 20, 1910.

A decree dated July 25, reserves to the nation the forests of Colombia producing cocoa-nuts, vegetable ivory, quinine, rubber, gums or resins, fibres and valuable woods. These forests therefore cannot be appropriated as waste lands (*tierras baldías*).

Colombia

Prohibition of Exportation of Immature Timber from the Gold Coast. — *The Board of Trade Journal*, London, N. 723, 1910, p. 34.

The Gold Coast Government Gazette contains a notice laying down certain rules under the Timber Protection Ordinance of 1907, under which it is provided that no person may sell, export or be in possession of timber cut from a tree below a girth of 9 feet at a point one foot above the convergence of the buttress roots, or at the base where there are no such roots.

Gold Coast

W. DALLIMORE. Tree-plantations in Inverness-shire. — *Nature*, No. 2137, October 13, 1910, p. 470.

Writing on tree-plantation in Inverness-shire in the *Kew Bulletin* (n. 7) Mr. W. Dallimore gives some useful data on the cost of the plantations and the kinds of trees which have given the best results on different estates. The area planted out on the Ardverikie Estates since 1873, exceeds 10 000 acres, for which more than 34 million plants have been required. The Scotch pine, the larch, and the spruce have been planted in great numbers; the pine and larch have grown well on dry soil, at altitudes exceeding 900 feet (273 metres); whilst the spruce thrives better on damp soil. *Abies obilis* has, on the whole, proved the hardiest of the three.

Great
Britain:
Scotland

The cost of planting, including fencing, is estimated at £ 3 12s (90 frs.) per acre. The interesting fact is noted that a larch plantation, on the Invergarry Estate, which had been condemned owing to the larch disease, but which was spared on the representations of the forestry in charge, now produces splendid trees, straight and sound.

Afforestation and Scenery Preservation in New Zealand. — *Nature*, No 2138, Vol. 84, Oct. 20, 1910, p. 505. London.

Great
Britain:
Scotland

The Department of Lands in New Zealand, is responsible for the management of the State nurseries, re-afforestation and the preservation of natural scenery. Reports for 1909-10 of this Department show that five nurseries produced 12 000 000 young trees; 8 000 000 of which have been used for re-wooding seven plantations.

The nursery trees are nearly all European, chiefly larch, *Pinus laricio*, spruce, and *Pinus ponderosa*. Of the Eucalypts, *Eucalyptus Stuartiana*, has proved a fast grower, and is being planted. Mixed plantations and deciduous trees have not generally given good results.

Additional areas, amounting to 1500 acres (607 hectares), have been reserved during the year for the preservation of scenery.

GIFFORD PINCHOT. Forest Conservation Programme in the United States. (Second National Conservation Congress, St. Paul, Sept. 5-8).—*American Forestry*, Vol. XVI, No. 10, pp. 585-587, Washington, Oct. 1910.

As the Second National Conservation Congress, which met in September at St Paul, Minnesota, Mr. Gifford Pinchot delivered an address on the Conservation programme, laying down the following principles:

United
States

"First.—All forests necessary for the public welfare should be in the public ownership, such as the national forests already in existence, the proposed Appalachian and White Mountain national forests and the State forests of New York, Pennsylvania, Wisconsin and other States.

"Second.—The protection of forests against fires is the first duty of forestry of states and nation alike. The way to stop fires is to get men to them as soon as they begin. The maintenance and extension of forest fire control by the nation, the states, and their subdivisions, and by associations of private citizens who own timberland is absolutely necessary.

"Third.—The protection of existing forests by wise use is the first step in forestry. Reforestation is the second.

"Fourth.—Land bearing forests should be taxed annually on the land value alone, and the timber crop should be taxed when it is cut, so private forestry may be encouraged.

"Fifth,—The private ownership of forest land is a public trust, and the people have both the right and the duty to regulate the use of such lands in the general interest."

E. A. START. **The American Forestry Association.** (Second National Conservation Congress, St Paul 5-8 Sept. — *American Forestry*. Vol. XVI, No. 10, pp. 587-588, Oct. 1910. Washington.

Edwin A. Start, executive secretary of the American Forestry Association, submitted to the National Conservation Congress in St Paul, Minnesota, the following statement on behalf of his Association:

"No organization can more appropriately than the American Forestry Association make its statement and its appeal to this Congress. This Association is the first of our conservation organizations. It has a past of nearly thirty years to which it can point with pride of real achievement.

"In a very real sense we may say that the work of this Association, through long years of much misunderstood effort under the able guidance of the great leaders of the American forestry movement, made this Congress possible; for it was through the study of forestry and its relation to the country that the whole problem of our national resources came to be understood. The man who has given the conservation of natural resources its impetus, with the help of his distinguished chief, then President of the United States, was the recognized leader, the apostle and evangelist of the forestry movement; and to-day no portion of our natural resources holds a more important place than the forests. They are inseparably linked with soils and waters, both of which depend upon them in great measure, and as a product of the soil nothing exceeds the forest in value and in necessity to human welfare. Forests, like agricultural crops, belong to the renewable class of products and their maintenance involves much more complicated and permanent problems than the non-renewable products like minerals, oil, and gas.

United
States

« Therefore, we conceive the field of our Association to be vital and lasting and so broad, many sided and farreaching as to amply justify the existence of an association dedicated to the advancement of scientific forestry for the best utilization of our forest lands for all time.

« Our work is independent of that of the Government, but conducted in close touch with it. As an independent body of citizens we can do and say what Government officials cannot do and say:

« Our program embodies:

1) An equitable system of taxation which shall not unduly burden the growing crop.

2) Adequate protection against fire, which will reduce this greatest of forest perils to a minimum.

- 3) The practice of scientific management upon all existing forests.
 - 4) The planting of all unoccupied lands which can be utilized more profitably for forestry than for any other purpose.
 - 5) The whole to be brought about through harmonious adjustment of functions between the three classes of owners: national, state and private.
- "We do not believe that either one of these agencies is to be relied upon alone. Each has its place. I say this because our position in this regard is often misconceived. I may add, to correct another misapprehension, that we do not believe in putting under forest land that is more valuable for agriculture. Forestry and agriculture are not rivals. They go hand in hand."

Resolutions of the Conservation Congress.—*American Forestry*, Vol. XVI, No. 10, pp. 597-600. Washington, October 1910.

Amongst other things, the Congress approved "the continuance of the control of the national forests by the Federal Government" and approves "the policy of restoring to settlement such public lands as are more valuable for agriculture." The Congress recommended that the "states and federal governments acquire for reforestation land not more valuable for other purposes, and that all existing forests publicly and privately owned be carefully protected by state and federal governments."

The Congress recognise "the invaluable services rendered by the Forest Service to the people, and earnestly recommend that it be more generously supported by the Federal Government, and that state, federal and private fire patrol be more generously provided for the preservation of forests and human life," and appreciate and approve of the continuance of the Services of the U. S. Army in fire-control in emergencies."

The Congress recommends further:

"That the Federal Government conserve migratory birds and wild-game animals;

"That the public and private Schools instruct the youth of the land in the fundamental Doctrines of Conservation."

L. RODWAY. **Forestry Notes in Tasmania.** — *The Agricultural Gazette*, Vol. XVIII, No. 9, Pp. 208-210, Hobart, September 1910.

(A continuation of a series of articles by the botanist of the Tasmanian State, Mr. L. Rodway).

Notes on the technical importance of the following trees, of interest for Tasmania.

1) *Cupressus*:

Monterey Cypress, *Cupressus macrocarpa* Hartw;
Lawson's Cypress. *C. Lawsoniana*, Andr. Murr;

Yellow Cypress, *C. nootkatensis*, Don (1);
 Himalayan Cypress, *C. torulosa*, D. Don;
 White Cedar, *C. thyoides*, Linn).

2) *Thuya*:

Giant Thuja, *Thuya gigantea*, Nutt.

3) *Libocedrus*:

Californian Incense Cedar, *Libocedrus decurrens*, Torr.

4) *Juniperus*:

Red Cedar, *Juniperus virginiana*, Linn.

H. BAUER. **Assimilation in Young Conifers.** (Stoffbildung und Stoffaufnahme in jungen Nadelhölzern. Eine forstchemische Untersuchung.—*Naturwissenschaftliche Zeitschrift für Forst- und Landwirtschaft*, 8 s. H. 10, pp. 457-498, Stuttgart, Oct. 1910.

A complete series of chemical analyses made at different periods of the year of various parts (roots, stem, leaves) of larch, pine, spruce and fir have led Mr. Bauer to important conclusions on substance formation in conifers.

Germany

The statements made are partly new, partly the practical proof of old ones.

The following chief conclusions are typically referred to particular trees, but have also a general bearing.

In the larch, after the shedding of the leaves, the constituents that return into the sap are deposited in the stem, returning into circulation in spring-time.

In pine and fir, the first formation of matter on the re-awakening of vegetation is produced at the expense of the nitrogen and of the mineral substances stored in the stem and in the roots.

In the spruce, vital energy during spring is chiefly engaged in the absorption of nourishment more than in the formation of new matter.

And in the fir, the organs which have been impoverished during the spring by the re-awakening of vegetation are enriched again the autumn.

(1) In Index Kewensis, *Cupressus nootkatensis*, Lamb. synon. with *Cupressus nutkaensis*, Hook. [Ed.].

H. SHIRASAWA. **The Japanese Larch**, (*Larix leptolepis*). — *Quarterly Journ. of Forestry*, Oct. 1910. London, p. 307.

The *Larix leptolepis* grows wild in the Central Mountain Range of the Main Island of Japan, where it abounds at an altitude of 3000 feet in the regions of Nikko, Shirane, Asama and Fuji; it is generally found associated with other species, but sometimes forms forests by itself.

Japan

It was recently planted in the Nagano Prefecture, on the North-Eastern slope of the Main Island and also in the Hokkaido. It may grow to a height of 50 feet, and a diameter of 6 inches in the space of 20 years; at the end of 50 years it may reach a height of 85 feet and a foot in diameter; its height at 150 years is often 130 feet and its diameter 2 feet 6 inches.

This species is suited to any kind of soil. It grows well in a dry soil composed of volcanic ash and is not affected by severe cold.

LEYENDECKER-HILDERS. **The Restoration of Beech Woods with Conifers**,

(Wann und wie bringt man in Buchenverjüngungen Nadelholznutzholz auf solchen Böden ein, welche die Einbringung edlerer Laubhölzer nicht angezeigt erscheinen lassen?) XXIX Versammlung des Hessischen Forstvereins. — *Allgemeine Forst und Jagd-Zeitung*, 86 J., pp. 384-86. Frankfurt-am-Main, October 1910.

Germany

The decrease in the timber yield of forests of pure beech confers importance on the problem of their restoration by the help of other species. The following species are suggested, when inadvisable to introduce oaks or other broad leaved trees:

1) The spruce (1) provided the soil be cool enough. In any case only forest glades should be planted with this species.

2) The forest pine (2), to be planted in stony ground of an average or inferior quality.

3) The fir (3), for good, cool soil.

4) The; larch (4), is the most suitable for mixing with Beech (5) in any proportion; the Japanese Larch (6) is equally good, as well as the Weymouth Pine (7), the Douglas Pine (8), and, for damp soil, the Sitka Pine (9).

(1) *Picea excelsa* Link = Fichte = Spruce.

(2) *Pinus sylvestris* L. = Kiefer = Scotch Fir.

(3) *Abies pectinata* DC. = Tanne = Fir.

(4) *Larix* sp. = Lärche = Larch.

(5) *Fagus* sp. = Buche = Beech

(6) *Larix leptolepis* Hort. = Japanische Lärche = Japanese Larch.

(7) *Pinus Strobus* L. = Weymouthskiefer = Weymouth Pine.

(8) *Pseudotsuga Douglasii* Carr. = Douglasfichte = Douglas Pine.

(9) *Picea sitchensis* Trautv. et Mey. = Sitkafichte = Sitka Pine. [Ed.].

Railway Sleepers of Beech Wood. (Für die buchene Einsenbahnschwelle).
— *Forst- und Jagd-Zeitung*, J. 29, N. 41, p. 375. Wien, October 14, 1910.

A railway sleeper of the best beech wood when injected with preservatives weighs about 120 kilos; if oak, the weight is 100 kg.; and if pine 70 kg. Besides being more durable, beech wood sleepers hold screws better than oak.

In order to ensure durability, the wood must, however, be perfectly sound before injection. By the new economical method of treatment, 16 kg. of tar oil are sufficient for one beech sleeper, instead of 56 kg., as formerly required.

The sleeper is previously treated with from 14 to 18 kg. of a weak solution of zinc chloride.

Austria

Restoration of Chestnut-Woods in France. — *La Halle aux Cuirs*. Paris, October 16, 1910, p. 670.

The Syndicate of French manufacturers of tanning and dyeing extracts intends to give an annual subsidy of 1500 frs. to the Department of the Gard. This sum, added to subsidies from the Department and the State, will be used as follows for restoring chestnut woods, in accordance with the decision of the Departmental Commission:

France:
Gard

1) compensation to those who plant new chestnut woods or replace the felled chestnut-trees;

2) contributing to the institution of experimental stations in districts affected by chestnut-disease, for the discovery of disease-resisting stocks.

T. J. ALLDRIDGE. Camwood. (A Transformed Colony: Sierra Leone).—London, Seely and Co., 1910, 8°, p. 354.

The Camwood tree grows in Upper Mendi, in the lower countries near the coast, and in the forests between Bo and Baiima. This timber, which is extraordinarily hard and heavy, gives fine, long thick logs, sometimes attaining 14 inches in diameter.

Sierra
Leone

When the trunk is felled and the sapwood chopped away, the heart which is the part used for trade, is orange coloured, but this wood rapidly darkens on the surface and becomes a beautiful blood red.

The trade in this wood was organised as soon as the railway ran through the forests near Baiima, but as the price offered was unprofitable,

(1) The tree producing Camwood is the *Baphia nitida*, Lodd. [Ed.]

the attempt failed. However, camwood is really too beautiful to be long neglected, and it is very probable that new styles of furnishing will renew the demand and thus revive a trade which had an unprecedentedly short duration in this remote part of the Sierra Leone Protectorate.

Philippine Lumber Exports.—(*Mindanao Herald*, June, 1910). *The Tropical Agriculturist*, vol. XXXV, No. 3, p. 221. Colombo, Sept. 1910.

Philippines:
Mindanao

The Port Banga saw-mill is exporting hard woods from Mindanao, cut into planks, for the manufacture of high-class furniture: 200 000 cub. feet were recently sent to the United States, 98 000 feet to London and Rotterdam, and orders have been received for new consignments.

F. MAIN. Tree Felling by Electricity. — *Journal d'Agriculture Tropicale*, Sept. 30, 1910, No 111, p. 273, Paris.

The following information is given on tree-felling by thermo-cautery.

Germany

The Thermo-cautery — a German invention — is a metallic wire, 1 millimetre in diameter, moved backward and forwards by a motor and an eccentric wheel. By friction the wire becomes so heated as to char the wood, eating its way through the trunk. Felling by this means is rapid; only 6 minutes are required for a tree 50 cm. in diameter. Even trees 3 m. in diameter can be easily cut. The apparatus is not cumbersome, and can be adjusted so as to cut trunks either above or below the level of the soil. If the timber yard does not possess an electric plant, a petroleum, or benzene electrical motor may be applied, as frequently done, to supply the requisite energy.

No information is given as to the economy of tree-felling with the thermo-cautery, but it is certainly a time-saving and waste-preventing process.

R. S. TROUP. Fissibility of some Indian Woods and Prospects of the Match Industry for the Indian Empire. — *Indian Forest Records*, Vol. II, Part II; *Indian Forest Memoirs*, Vol. II, Part I; *Nature*, No. 2139, Vol. 84, p. 547. London, October 27, 1910.

British
India

Experiments on the fissibility of woods show that splitting depends mainly on the nature of the grain, and that a hard wood with straight grain like *Acaçia Catechu* splits more readily than a cross-fibred soft wood, like the *Bombax malabaricum*. Tests were made to compare the cleaving force required in radial and tangential planes, with the result that for most timbers cleavage proved to be easier in the latter plane.

The memoir on match-wood is very comprehensive and sets out the results of practical manipulation with different woods, suitable location for

factories, the possibilities of obtaining supplies, and an article on the manufacture of matches.

Some Indian trees yield excellent wood for the match industry, amongst which *Bombax malabaricum* (1) and *B. insigne* (2).

Sawdust Cakes for Horses. — *Revue des Eaux et Forêts*, October 1, 1910, p. 603.

A German paper gives an account of sawdust bread. Works in Berlin are producing about 200 quintals of "wood bread" per day.

Germany

This cattle-food is made by submitting the sawdust to several chemical processes after it has been fermented, and then mixing it with rye flour in the proportion of two parts of sawdust to one of flour. It is then baked in the same way as ordinary bread.

The product is used for feeding horses, but it is said that it could serve as human food in famines.

Wood Pulp from Newfoundland. — (*La Nature*). *Revue des Eaux et Forêts*, October 1, 1910, p. 607.

Some few years ago, the Amalgamated Press, which publishes the *Daily Mail*, *Daily Mirror*, *Evening News*, and about forty other daily and weekly publications in England, decided to make its own paper. Putting together a capital of 30 millions frs., the organisation bought two million acres of forest in the North-East of Newfoundland, at a place called Grand Falls, building paper mills on the spot.

Newfoundland

The mills, which are in full working order, have a motor force of

(1) « The *Bombax malabaricum* belongs to the family of Malvaceae, it is known under the name of the Red Silk Cotton Tree, common through the hotter forests of India, Burma and Ceylon. The tree yields a brown gum sold in the bazars under the name *Môcharas*, also known as Supari-ka-phul. The gum only exudes from portions of the bark that have been injured by insects or decay, for incisions in the healthy bark do not cause it to flow. The inner bark of the tree yields a good fibre, suitable for cordage. The seeds afford the so-called Red Silk Cotton, or Semul-Cotton, useful like Kapok for stuffing pillows ».

The roots form part of the Indian medicinal drug *Musla-Semul*.

"The timber of *Bombax malabaricum* is not very durable except under water. It is used for planking, packing-cases, toys, etc. The tree is called the *yama-druma*, or tree of the infernal regions, or of the god of death, because it makes a great show of flowers and produces no fruit fit to eat. The cotton is made into tinder, and the wood used in the Ahmedabad match factory. Of all readily available timbers it is one of the most suitable for that purpose." (Sir GEORGE WATT, *The Commercial Products of India*, London, 1908, p. 168).

(2) The *B. insigne* yields a brown gum. See Watt, *A Dictionary of the Economic Products of India*, vol I, p. 487, Calcutta 1889; DUJARDIN-BEAUMETZ and EGASSE, *Les Plantes Médicinales Indigènes et exotiques*, p. 101, Paris, 1889. [Ed].

30 000 H. P., and will later on have 80 000. The output is 90 metres of paper per minute. A first consignment of 2 000 tons, sufficient to make 40 000 000 copies of a 12 page paper, has been sent to London by a specially chartered steamer.

A town which already numbers more than 3 000 inhabitants has grown up round these works, in addition to the woodcutters' huts scattered through out the forests. The trees are felled in the autumn and winter, giving work to the cod-fishers who are unemployed at that time of the year. The logs are floated down the rivers to the mills, and the rolls of paper are afterwards taken by rail to Botwood, whence fast steamers carry them in four days to London.

Bamboo for Paper-making. — *Annales Forestières. Revue des Eaux et Forêts.* Paris, October 1910, No. 20, pp. 632-633.

South
East
of
Asia

Inexhaustible reserves of fibre exist in South East Asia, including India and Ceylon, which could be used for the manufacture of paper pulp. The chief of these is furnished by the common bamboo, which is now recognised as the most suitable for this industry.

The Identification of Timber. — *Mitteilungen aus Deutschen Schutzgebieten*, vol. XXIII, part. II; *Nature*, No. 2139, vol. 84, p. 546, London, October 28, 1910.

Kamerun

In this paper Dr. Büsgen deals with the distinguishing characters of trees, observed during an expedition through the German Cameroons, and gives a series of engravings illustrating sections of the more important timbers, the original samples of which are at the Forestry College in Münden.

Amongst these timbers are the following: *Chlorofora excelsa*, which appears to be identical with African teak; *Enantia chlorantha* a yellow wood; *Entandophragna Candollei*, a mahogany wood; *Lophira alata*, also known as ironwood; and *Mimusops Djave*, the Congo mahogany.

J. S. WOOLSEY **A new Type of Resin Collector.** — *Nature*, No. 2135, Sept. 29, 1910, p. 402.

United
States:
Florida

Mr. Woolsey describes in the *Indian Forester* for August a new and peculiar type of resin collector, which is being tried in the pine forests of Florida. Two small tunnels, 5 inches in length by an inch in diameter, are made in the tree, both starting from the same spot and passing tangentially through the sap wood. The collector consists of two metal caps set at right angles and connected by a hollow angle piece. One of the caps is

fitted to the mouth of the two openings and a glass jar, into which the resin flows, is fitted to the other horizontal cap.

It is claimed that this method increases the yield and prevents evaporation, at the same time furnishing a clean product.

C. h. COEFIGNIER. **The Varnish Industry in 1908-1909.** — *Revue de chimie industrielle*. Paris, Sept. 1910, N. 249, p. 265.

This analytical review of works published in 1908-1909 on resins, copals and elemis, used in the varnish industry, contains information on the copals of the Congo and Benguela, the elemis of Africa, and the most recent chemical researches on essence of turpentine, from which the following notes on the pine oils, Chinese Oil and Poison sumac are taken.

Congo
China
Hungary
Russia

Chinese Oil is obtained from the seed of *Aleurites cordata*. The tree yields from 52 to 82 kg. of oil when 5 or 6 years old, and could be cultivated in the South of France and in Algiers.

The *Poison Sumac*, *Rhus Vernix*, is a tree yielding a lac similar to that of the Japanese *Rhus vernicifera*.

The pine oils are obtained by distilling the needles and cones of the different pine trees in the Austrian Tyrol, Hungary, the region of the Ural and the North of Russia. By treating these oils with ozone in the presence of acetic acid a product similar to essence of turpentine is obtained.

W. M. ROYDS. **Japanese Turpentine.** — *The Board of Trade Journal*, No. 721, 22nd Sept. 1910, London, p. 605; and the *Chemist and Druggist*, London, Oct. 22nd 1910, p. 64.

The British Acting Vice-Consul at Hakodate reports that, preliminary experiments having proved very successful, the manufacture of turpentine by the Government is to be commenced shortly.

Machinery for the purpose, to the value of 150 000 yen (about £15 000) has been ordered.

Japan:
Karafuto
(Sakhalin)

It is hoped eventually to produce a very large amount of turpentine, as the sources of supply are almost inexhaustible. The Acting Vice-Consul has forwarded samples of raw turpentine extracted from the tree *Larix dahurica*, Turez, known in Karafuto (Sakhalin) as the "Rakuyosho"; and of refined turpentine oil, produced at the Government experimental laboratory, and of the resin left after the extraction of the oil.

Vegetable Tannins. — *La Revue de Chimie Industrielle*, Sept. 1910, 21st year, No. 256, Paris.

A large number of tannins are used in the leather trade, and Mr. Thuau, in *Le Cuir*, gives the following table of the chief tannins obtained from roots, leaves, galls, fruits, or the bark of trees:

	Raw Products	Average percentage of water	Average percentage of tannin	Limits of the Tannin percentage
France	Algarobilla	12.5	43	35 to 52
	Birch (bark)	13	10	6 » 18
	Canaigre	—	25	20 » 30
	Chestnut wood	14.5	8	7 » 9
	» » extract (25° B)	58	30	28 » 32
	Oak wood.	14.5	—	6 » 9
	» bark	13	10	5 » 17
	» » extract (25° B).	—	25	20 » 28
	Divi-Divi	13.5	41.5	30 » 50
	Gambier	—	—	40 » 55
	Bark of Kermes Oak	13	25	18 » 30
	Hemlock bark	14.5	15	10 » 16
	Gall-nuts	16.5	30	24 » 38
	Malette (bark of)	14.5	42	35 » 55
	Mangrove bark	14.5	36	25 » 45
	Mangrove extract (dry)	—	60	55 » 62
	Mimosa bark.	14.5	34	20 » 40
	Myrobolans	13	32	20 » 48
	» extract	—	25	23 » 30
	Pine bark	14.5	11.6	6 » 20
	Quebracho wood	14.5	20	15 » 28
	» extract (dry)	20	65	60 » 75
	» » (25° B)	—	34	30 » 38
	Rove (? <i>Ed.</i>)	14	30	24 » 46
	Sumach.	12	25	23 » 32
	» extract.	—	20.8	18 » 26
	Trillo	14.5	43.5	30 » 50
	Velonea Acorns.	15.5	28	16 » 38

United
States:
Virginia

C. R. DELANEY. **Varieties and Analyses of Virginia Sumachs.**—*Leather Chem. Assoc.* 1910, 5, 404-405; *Abst. Journal of Chemical Industry*, October 10, 1910, No. 19, London, p. 1169.

The preparation of tannic extracts from the Virginian sumach, is suggested. A comparison is made with the price of the extracts prepared

in other countries, and a table given of analyses of samples of *Rhus glabra*, *Rhus typhina* and *Rhus copallina*.

Mangrove Tannin. Partie technique, Suppl. to *La Halle aux Cuirs*, No. 10, Octoqer 9, 1910.

Experiments are being made in different parts of the French Colonies for promoting mangrove plantations as a source of tannin. Large plantations of mangroves are suggested for the shores of the lake near Tunis, to prevent landslips at Bahira. The species proposed for planting are either the *Rhizophora Mangle* L. or the variety *racemosa* G. F. W. Mey, growing on the eastern coast of America, and on the West African Coast in Guinea, San-Thomé, Grand Bassam on the Ivory Coast, Sierra Leone, the Congo, etc.

Tunis.
Venezuela

Mangrove wood is very hard, giving excellent timber; in this wood, the heart is a dull or brownish red. The San-Thomé Mangrove bark contains about 17.5 % of tannin and a red colouring matter, used to dye fishing nets.

Mangrove tannin is nearly white when pure, but red brown as ordinarily prepared; it resembles the tannin of the horse-chestnuts, of tormentilla and of rhatany; and is identical with the tannin of Mimosa bark. Indeed, mangrove-tannin needs further study.

The mangrove bark, formely collected in large quantities near the Lake of Maracaibo, is very difficult to find now-a-days, the Maracaibo mangroves having been almost completely exhausted by the large exportation to the United States; the price of the bark has risen 16 frs. per ton in consequence. This rise in price gives encouragement to introduce mangrove plantations in the French Colonies.

A New Method of Coagulating Rubber. The Pracol. (Aufbereitung der Kautschukmilch).—*Gummi-Zeitung*, Berlin, 28th Oct. 1910.

In centres of raw rubber production experiments have been made to find rapid and efficacious methods of coagulation, in order to obtain a good quality of rubber. In London, Mr. Aubrey has discovered for this purpose a new method which favours coagulation and prevents fermentation. This system which is easy and economical, has already been adopted by the *Peruvian Amazon Rubber Company*, and has been monopolised by a London Syndicate, which puts the requisite preparation on the market under the name of *Pracol*. This product is sold in tubes; the contents of a tube, dissolved in a pint of water, are sufficient to coagulate two gallons of rubber latex.

Peru

Oil from Seeds of Hevea Brasiliensis.—*The India Rubber World*, New York, 1st Oct. 1910.

At a recent meeting of the *United Planters' Association of South India*, report was made on the vast plantations of *Hevea Brasiliensis*, made during recent years and which have already begun to bear seed.

British
India

The production of the seeds will naturally go on increasing. It is calculated that after the fifth year each tree will give 500 seeds, those of 400 trees weighing a ton (1016 kgs.). The seeds contain about 20% of oil, valued at 500 frs. per ton. The report demonstrates the advantage of gathering the seeds and pressing them to extract the oil. The oil-cake may be used as manure for the *Hevea* trees.

PETCH. How to place Seeds when sowing Hevea. — *Journal of Board of Agriculture*, British Guiana, 3rd January 1910. *Tropical Agriculturist*, Vol. XXXV, No. 3, p. 202, Colomho, Sept. 1910.

Seedlings of *Hevea brasiliensis* frequently grow up so bent and twisted that they sometimes form nearly complete circles. Mr. Petch, of the Botanical Department of Ceylon, explains this peculiarity in a recent paper where he demonstrates how the manner of placing the seed at the time of sowing contributes to bring about abnormal growth. The seed of the Para is a slightly flattened ellipsoid, in which the upper and lower sides and the micropyle are easily distinguished. The experiments described by Mr. Petch were repeated in British Guiana. 5000 seeds were placed in the soil, 1000 in each of the five following positions: *horizontally*, with the lower side downwards, germination 61.1%; with the upper side downwards, germination 63%; *sideways*, germination 65%; *vertically*, with the micropyle turned down, germination 61.4%; with the micropyle upwards, germination 54.7%. This last position gives the greatest number of twisted seedlings, while the horizontal position appears to be the most favourable to normal growth.

New Method of tapping Trees for Rubber. (Ein neues Zapfsystem. — *Gummi Zeitung*, Berlin, 28th Oct. 1910.

Mr. Spence, C. E., of Glasgow, has invented a new method for tapping rubber trees for the extraction of rubber. Above and below the incision, and at a certain distance around, strong pressure is applied to the bark by means of a steel ring, fixed round the trunk. This ring is gradually drawn near to the incision squeezing out the latex, which flows into the cups.

Hevea Brasiliensis Seeds and their Oil. — *Journal of the Royal Society of Arts*, No. 3021. London, 1910.

The demand for seeds of *Hevea brasiliensis* is superior to the supply; and the authorities of the Botanical Garden of Singapore have decided to refuse any further orders for seeds before the spring of 1911, in view of the enormous quantity of seed already reserved.

Ceylon
and
British
Guiana

Great
Britain

Straits
Settlements

Soon however there will be extra supplies from many millions of trees which are being planted. These seeds may furnish a fine clear oil, of as good drying properties as the best linseed oil.

Taking into account the commercial value of the seeds, it has been proposed to provide the plantations with seed-crushing machines. In this way the residues could be utilised as fodder and manure.

Singapore Rubber. — *Journal of the Royal Society of Arts.*, No. 3015, Vol. LVIII, Sept. 1910, p. 922.

The vast stretches of uncultivated land in Singapore which have lain fallow since the cultivations of the *gambier*, the coffee plant, and the pepper tree were abandoned, are now the scene of great activity.

Rubber is being planted there, and seems to thrive. A large marshy area in the neighbourhood of Singapore has been drained, and converted into a nursery for para-rubber trees, which are sold at a profit in the island. Several square miles of land in Malacca, hitherto the haunt of the tiger and other wild beasts, have been transformed into flourishing rubber plantations. To-day Malacca, after a long period of neglect, is in a prosperous condition. Till quite recently, there was no bank in Malacca: there are now three, doing a good business, and the town will soon become an important centre.

**Straits
Settlements**

T. PETCH. Experimental Tapping of Hevea at Singapore. — *Tropical Agriculturist*, Vol. XXXV, No. 3, pp. 194-197. Colombo, Sept. 1910.

Experiments were made at Henaratgoda, in 1905-1906, which showed, on a superficial examination, that more rubber was obtained by tapping the trees once every two days than by repeating the operation every day. Many persons, however, do not adopt this method; for, though the amount obtained by tapping every other day is greater than that obtained by daily tapping, it is not equal to double the latter. The total rubber collected by the end of the year by the alternative process (one day out of two) is less than that collected by the continuous process, although more than half. Experiments on the subject would seem to show that the actual amount is three quarters. The advantage lies in the decrease of the net cost per pound of rubber; but daily tapping yields, in a given time, the best return.

**Straits
Settlements**

Rubber Cultivation in Penang. — "*The Board of Trade Journal*." London, No. 723, 1910.

Rubber-growing in Penang developed considerably during the past year. It is mainly in the hands of Chinese and Malays, and hitherto its importance has been inconsiderable, but it is now rapidly spreading.

**Straits
Settlements**

During the year new companies have been formed to grow rubber in the province of Wellesley. Many small farms have already been planted with rubber, and their condition is satisfactory.

In the district of Dindings, the cultivation of rubber is looked upon as the only hope of that region. The Sandycroft Estate is very prosperous, and will become still more so. Plantations are being pushed forward on other estates. The quantity of rubber exported from Penang in 1909 amounted to nearly 1000 tons, but most of it came from other producing centres.

A. M. BURN-MURDOCH. **Forest-Improvement in Malacca.** (Notes on Works of Improvement in the Federated Malay States Forests).—*The Indian Forester*, vol. XXXVI, No. 10, Allahabad, October 1910, pp. 566-571,

The forests may be divided, for purposes of improvement, into two principal classes:

1. The gutta-percha forests;
2. The forests for timber.

These two classes of forests are not, however, always distinct, and it often happens that gutta-percha is found here and there, though seldom in considerable quantities.

Federated
Malay
States

The forests of the first class are generally a little less thickly wooded than those of the second, and the finest trees are the *Palauquium Gutta*, the *P. oblongifolium*, and one or two other species of *Palauquium*.

"Fortunately there is no mistaking the Gutta-percha tree, known to the Malays as *Getah-Tuban-Merah*. It has rather stiff leaves, glossy dark green on the upper surface, and a golden brown colour on the under, and can be recognized by any one. Good instances of the Gutta-percha forest are found in the Trollah Forest Reserve, Perak, in the Rantau Panjang Reserve, Selangor, and in many other tracts."

Important details are given by Mr Burn-Murdoch on the method followed for the improvement of the Gutta-percha forests.

In the second class of forest, the useful species come in the following order:

1. Chengal, *Balanocarpus maximus*;
1. " " *Wrayi*;
2. Merbau Bukit, *Afzelia retusa*;
2. " *Afzelia*, " *Palombanica*;
3. Tembusu, *Fagraea flagrans* and *speciosa*;
4. Penaga, *Mesua ferrea*;
5. Kulim, *Scorodocarpus Borneensis*;
6. Keranji, *Dialium laurinum*;
7. Kledang, *Artocarpus*;

8. Merauti, *Shorea* and *Hopea* various species;
9. Jelutong, *Dyera costulata*;
10. Tampines, *Seoetia Sideroxylon*;
11. Resak, *Shorea barbata*;
12. Balau, » *materialis* (Ridley),

"Jelutong is important for its latex, which it yields in large quantities, producing a low grade rubber, it also yields a soft white timber used for planking of ceilings and for native clogs. Chengal, Merbau, Resak are hard and heavy, useful for sleepers and for building, bridges, as posts, beams, etc. Tampines is useful for any purpose in which great strength is required."

CARLISLE. Rubber Production in Indo-China. — *The Board of Trade Journal*, London, Oct. 20th, 1910.

The rubber at present exported is obtained from trees which grow wild, especially in the forests of Upper Laos. Such an unskilful method is adopted for the extraction of the product that the yield is continually diminishing, and has finally fallen from 372 tons in 1905 to 35 tons in 1909. Some plantations of *Hevea* have been made in South Annam and in Cochin-China, but they are not yet productive. At the end of 1909 there were fifteen plantations containing 650 000 trees. The production of rubber from existing plantations will not exceed 6 tons in 1910, but it is expected that it will reach 1000 tons in 1918. It would seem that the winters in Tonkin are too severe for *Hevea*; there exist, however, plantations of *Ficus elastica*.

A new rubber tree was discovered three years ago in Northern Tonkin, and named *Bleekrodea tonkinensis* (1).

The Association of Rubber Planters of Cochin-China. — *La Quinzaine Coloniale*, Paris, No. 18, 1910.

A Rubber planters Association (*Association des Planteurs de Caoutchouc de Cochinchine*) is about to be constituted in Saïgon for the cultivation of rubber trees and the sale of their products; it will also promote the operations of buying and selling the seeds, plants and rubber, and aid in recruiting foreign or local labour.

The new Association has its headquarters at the Saigon Chamber of Agriculture, and its statutes were published in the July number of the Bulletin of this Chamber.

(1) *Bleekrodea tonkinensis* is not named in the *Index Kewensis* and its supplements up to 1908. [Ed.].

French
Indo-China
and Siam

French
Indo-China
Cochinchina

Recent Investigations on Rubber-Culture. — (*Tropical Life. The Agricultural News. Imp. Dep. of Agr. for the West Indies. Bulletins of the Malay States, and of the Hawaii Agric. Exp. Station*). *Nature*, No. 2138, Vol. 84, Oct. 20 1910, p. 510. London.

Experiments are being made in the cultivation and preparation of rubber in several agricultural stations, and the results have been discussed in the agricultural press of tropical countries.

The effect of the modes of tapping on the yield of latex has been studied in Hawaii. It appears that a V incision yields less than the vertical cut. There is no advantage in making four tapplings per day instead of two.

Manuring with sodium nitrate appears to increase the flow of the latex. In one experiment, five trees, to each of which 226 grammes of nitrate were given, produced 25.5 grammes of dry rubber during the three days which preceded manuring, and 36.8 grammes during the three days following it. It still remains to be seen whether this fertiliser is economical. The experiments were made with the *Ceara* tree.

Numerous analyses of latex have been made at the Botanical Garden of Singapore. A 32 year *Hevea brasiliensis* yielded 764 grs. of latex at one tapping, of which 61.08% was water, 2.3% serum solids, mainly organic matter, and 36.29% coagulum obtained by means of acetic acid. Nearly all the coagulum was rubber, with a small amount of resin. In another variety, the *Landolphia Heudelotti*, the dry rubber yielded 89.5% of pure rubber and 10.5% of resin.

The extraction of the rubber from the latex is a very important question. It is considered that the difference in value between rubbers is partly due to the methods of dealing with the latex.

A process has recently been studied in which smoke, creosote and acetic acid are used in order that the latex may coagulate under similar conditions to those usual in Brazil. Steam under pressure of 30 or 35 lbs to the square inch (slightly more than two atmospheres), mixed with fumes from strongly heated green palm leaves, is injected in the tanks which contain the strained latex. In about ten minutes the globules of rubber coagulate and rise to the surface.

Rubber Industry in Tabasco and North Chiapas, Mexico. — *Bureau of the American Republics*, Washington, Sept. 1910.

There are about 35 rubber-tree plantations in the State of Tabasco and in Northern Chiapas, covering from 350 000 to 400 000 acres. The number of trees approximate 10 to 12 millions. These figures are probably trustworthy, coming from official information and from persons well acquainted with the local rubber industry.

LINARD. **Rubber Cultivation in Honduras.** — *Consular Notes. Bureau of the American Republics*, Washington, Sept. 1910.

A private Company has been authorised to lay out 3000 acres of virgin land suitable for raising rubber and it is now about to turn them into vast plantations. The Company intends to increase this area still more, so as to plant rubber-trees by hundreds of thousands. Up to the present no rubber trees have been cultivated in the country. The demand for wild rubber, or *scrap*, which is very abundant and is sold by the Indians, has made the local price rise from 38 cents to 1.33 gold dollars per pound.

Honduras

The planters, having found that the commercial demand for rubber greatly exceeds the world's production, are showing a very marked tendency to make rubber cultivation a permanent Honduras industry, to the gradual limitation of banana-culture.

G. B. GILLIAT SMITH. **Rubber Production in Venezuela.** — *Board of Trade Journal*, London, Oct. 20, 1910, p. 140.

In Venezuela, in the Upper Orenoco and in the valley of the Rio Negro, rubber comes from the wild *Hevea brasiliensis*. There is a considerable exportation of *balata*, the product of a tree known under the name of *purguo* (*Mimusops globosa*) which grows wild all over Venezuela, especially in the district of Guiana. Balata is sold at about £12 (300 frs.) per cwt. (50.08 kgs.).

Venezuela

A Venezuelan cacao planter has planted some 150 000 trees of the *Castilloa elastica* (of which some are already from 10 to 12 years old) among his cacao trees; but the quantity of rubber he exports as yet is very small.

Germination in two Species of Manihot: Manihot dichotoma, and Manihot pianhyensis.—*Gummi Zeitung*, Berlin, 28 Oct. 1910.

Manihot dichotoma Able, and *Manihot pianhyensis* Able, have been imported from Brazil into some British Colonies, to experiment their cultivation. The germination of the seeds was very satisfactory in the first species everywhere, excepting in S. Lucia. In Borneo, two months after sowing, the *M. dichotoma* had already grown to five feet, whilst *M. pianhyensis* gave lower but bigger plants.

Brazil.
S. Lucia.
Borneo.

Manihot Glaziowi and Bee-Culture in Dahomey. (Il Manihot Glaziowi e l'apicoltura). — *L'Agricoltura Coloniale*, (*Journ. d'Agric. tropicale*, Juillet), Sept. 1910, Florence.

West
French
Africa:
Dahomey

The introduction of Manihot in Dahomey furnishes a new source of honey for bees. In July, when it flowers, the wild bees neglect the native

vegetation and prefer the *Manihot*. The abundance of flowers and the prolonged blooming of the *Manihot* allow the production of Ceara rubber to be supplemented with that of honey and beeswax. It remains to be seen whether this honey originating from an *Euphorbia* has a good flavour.

R. KINDT. **Rubber Planting in the Belgian Congo.** — (*Bulletin de l'Assoc. des Planteurs de Caoutchouc*). Abs.; *Journal of the Soc. of Chemical Industry*, 15th Oct. 1910, No. 19. London, p. 1168.

Belgian
Congo

The *Funtumia elastica* is considered the only native species worth planting. The great value of this species consists in its growing successfully and of giving good yields in regions subject to long droughts. On the other hand, *Hevea brasiliensis* and *Manihot Glaziovii* are more hardy, are better yielders and are less sensitive to variations of soil and climate.

The *Hevea* can be planted with advantage where the dry season does not exceed four months. *Manihot* resists a dry season lasting from 4 to 6 months, where the *Hevea* could not thrive.

As regards the gathering of *Manihot* rubber, the following figures are given:

Locality	Number of trees	Age	Number of tappings	Dry rubber per tree
		years		grammes
Boma . . .	3	11	55	340
" . . .	1	12	12	625
" . . .	10	12	43	564
Veré . . .	10	12	5	130
Kitobola . .	40	8	10	198
" . .	190	8	39	90 (in the dry season).
" . .	200	8	25	92 (in the rainy season).
" . .	1000	8	7	42 (tappings at 10-day intervals).

The rubber of the Congo *Manihot* has been valued at Antwerp at 23 frs. per kilogram, the *Para* being valued at 25 frs. The *M. Glaziovii* should be sheltered from winds, to which it is more sensitive than *Hevea*.

German
East
Africa

G. K. R. **The Future of the Cultivation of *Manihot* in German East Africa.** (*Die Aussichten der Manihotkultur in Deutsch Ostafrika*). — *Gummi-Zeitung*, 25 J., No. 3, pp. 102-3. Berlin, 21 Oct. 1910.

It is impossible to forecast correctly the development and value of *Manihot*. It is therefore premature to affirm that the future of *Manihot* cul-

tivation is assured and to advise the laying out of large plantations. On the contrary, great prudence should be exercised in making new ones.

Although planters, who have used due caution, have little to fear, they ought all the same to be warned not to rely solely on *Manihot*, but to grow also some other remunerative crop, such as tea.

In any case it is desirable that further experiments be made, that the extraction process be improved, and that a more satisfactory manipulation of the latex be adopted.

Good quality in the rubber must be the chief aim for achieving sure profits in East African *Manihot* plantations.

H. JUELLE and H. PERRIER DE LA BATHIE. **Rubber Plants of North Madagascar.**—*L'Agriculture Pr. des Pays chauds*. September 1910, An. 10, No. 90, pp. 184-196.

Information is given on *Landolphia* and *Mascarenhasia* of Analalava, in continuation of what was published in the *Agriculture pratique des Pays Chauds* in 1909. The writers describe several little known species, of which only one, a *Plectanella* called *P. microphylla*, gives a tenacious and good rubber. *Landolphia Perrieri* var. *ambatensis* and *Landolphia crassipes* are exploited in the forest of Manongarivo: the South Antaimoros natives cut the lianas in bits, barking them by hammering (*martelage*), then they dry the bark and pound out the rubber (*pilonage*).

Madagascar

DUSSERT. **Ficus Albinervis, a Rubber Plant of Réunion Island.**—*L'Agriculture Pr. des Pays chauds*, Sept. 1910, No. 10, pp. 255-256.

This is a hardy form of *Ficus elastica*. There are about a hundred specimens of the plant in the "Providence" Garden at Reunion, and M. Dussert has found the plant at Mayotte, Angouzon, Dapany and Majunga. The tree is not at all exacting as to soil, quantity of water, heat, etc. Its latex yields 40 to 45 % of excellent rubber, or about 1 kilogram per tree per year, and trees from eight to ten years old are ready for exploitation.

Réunion

This *Ficus* may be of special interest for the Colonies of the Indian Ocean.

Plantations of the German Colonial Society "Sigi" (Sigi-Pflanzungs-Gesellschaft).—*Deutsches Kolonialblatt*. Berlin, October 1910.

In the plantations of the Sigi Society 300 000 *Ceara* rubber trees are yielding 19 270 kilograms of rubber. Further, 100 000 trees of *Kickxia*, 1 300 trees of *Hevea brasiliensis* and some *Ficus elastica* are shortly to be exploited.

German
East
Africa

The *Kapok* tree has already furnished 33 768 kilograms of floss and the plantations contain 177 000 trees. The cacao plantations occupy 100 hectares, with 48 800 trees.

The pepper plantation (*Piper nigrum*) is also well developed, and counts 30 000 plants. The *Cardamom* is about to be introduced, with an experimental plantation of 9 000 plants.

LUCION. **Natural and Artificial Rubber.** — *Revue Economique Internationale*. Paris, October 20th, 1910.

The *Para* of Brazil, extracted from *Hevea brasiliensis*, is the best rubber; it owes its superiority to the almost complete absence of resins. It represents half the production of the whole world.

Hevea begins to yield rubber from its seventh year, attaining the maximum secretion towards the thirtieth year. The United States of Brazil own more than 100 million hectares of *seringais*, or forests of *Hevea*. In Colombia, in Peru, etc., *Castilloa elastica* produces rubber. In Africa, the rubber producers are chiefly creepers, of which the most diffused are *Landolphia*, *Kickxia*, *Capodinus*, etc. The product from these plants is generally good, though sometimes only of average quality. In South Africa, in Mozambique and in Liberia, an impure, very resinous rubber is extracted from the *Membuku*, the *Ibunqu* and the *Mimusops*.

In Asia, Cochin China, India, Burma, Assam and the Sunda Isles, *Ficus elastica* gives a good rubber, but its exploitation proceeds very slowly. The enormously increased consumption is necessarily leading to the extension of rubber-cultivation. Numerous Companies have been formed in Europe and America for the culture and exploitation of rubber trees, and they have acclimatised different species in Java, Sumatra, Malacca, in the Antilles and in the African Colonies.

Expert culture and management of rubber plants may furnish a good raw rubber at 3, 4, or 5 francs per kilogram. [But what indeed would revolutionise the rubber markets would be the manufacture of artificial rubber.

On this subject Mr. Roussel observes: "We do not doubt that the manufacture of artificial rubber will in a few years jeopardize the *Hevea* plantations, permitting us to obtain a product of more uniform and constant qualities at small expense, to the great advantage of rubber industries."

Ceylon Camphor. — *The Chemist and Druggist*, N. 1001, vol. LXXVII, Oct. 1, 1910, p. 63. London.

The camphor tree grows well and quickly in Ceylon, when planted under favourable conditions, but it has hitherto [been difficult to develop this culture adequately on account of the difficulties in extracting the camphor.

If camphor trees are to be grown on a larger scale, expert advice on the preparation of camphor should be had.

Japanese Camphor. — *The Chemist and Druggist*, No. 1601, Vol. LXXVII, Oct. 1st 1910. London, p. 39.

The Official Report of the Japanese Ministry of Finance estimates the exportation of camphor from January to July at 1 593 901 yen (4 383 322 fr.).

Japan

Artificial Camphor. — (*Comptes rendus*. Paris, 1910, 150, p. 925); *The Chemist and Druggist*, p. 1601, vol. LXXVII, Oct. 1, 1910, p. 59. London.

M. E. Darmois states that he has succeeded in preparing, from essence of turpentine, an artificial camphor possessing an optical activity nearly equal to that of the natural product, by operating at a relatively low temperature. It is probable that at a still lower temperature a product identical with natural camphor may be obtained.

France

Candelilla Wax. — *The Chemist and Druggist*, N. 1601, vol. LXXVII, October 1, 1910. London, p. 64.

Small lots of this wax are now appearing on the London markets and in other European centres. According to the *Bulletin du Musée colonial de Haarlem* (July 1910) a Company has been formed at Monterey, in Mexico, for the exploitation of *Pedilanthus Pavonis*, the Euphorbia which produces it.

Mexico

This plant grows wild in North Mexico and in the neighbouring territory of the United States. It is a shrub of from m. 0.75 to m. 1.20 in height, and every part of it is covered with a thin coating of wax. The yield in the works is from 3 1/2 to 4 %.

The cost of a factory capable of producing 226 kilograms of wax per day is about 12 000 francs. The working expenses amount to 370 fr. per ton, and the price of the product is 3 000 fr. per ton. This wax is used for candles, varnishes, photographic plates and electrical isolators. It is hard, of a pale colour, with a high melting point. It is superior to the Carnanta wax as it keeps perfectly white.

R. L. CASTLE. **The Cultivation of Mushrooms.** — *Nature*, N. 1137, October 13, 1910, p. 470.

"The 'One and All' collection of gardening books publishes a small pamphlet on the cultivation of mushrooms, by Mr. R. L. Castle, recommendable as a practical and authoritative guide.

Great
Britain

GUFFROY. **Fertilisers for Mushrooms in France.** — *The Gardeners' Chronicle*, No. 3642. London, October 15th, 1910, p. 284.

France

Experiments in France, by Mr. Guffroy, show that the addition of phosphates to the manure on mushroom beds greatly increases the yield.

Immunisation against Poisonous Mushrooms.—*Scientific American*, vol. CIII, N. 16, New York, October 15, 1910, p. 291.

France

In a communication to the Academy of Sciences in Paris, MM. Radias and Sartory report that they extracted the toxic principle of the *Amanita phalloides* and of the *Amanita mappa*, which they then injected into the peritoneum of some rabbits, following the usual method for preparing therapeutic serums. After four months treatment, the rabbits were completely immune, and could eat the most poisonous mushrooms with impunity. These experiments would indicate that poisoning by mushrooms could be treated by means of serums similar to those employed against diphtheria, etc.

Live stock Breeding.

Aviculture. — Beekeeping. — Silk-Production. — Animal Industries.

A. WEISSERMEHL. **Feeding Horses with Potatoes to the Exclusion of Grains.** (Kartoffelfütterung an Pferde als vollständiger Ersatz für Körner). *Ztschr. f. Spiritus Industrie*, XXXIII J, N. 41, 503, Berlin, 13 Oct. 1910.

Germany

For three years working horses, during the greater part of the year, have been fed with potatoes, without receiving cereals. The horses kept in excellent condition, although obliged to work hard. The rations suggested are: 30 lbs. of potatoes (14 kilograms) during winter and 40 lbs. (18 kilograms) during spring, summer, and autumn. The potatoes are boiled and then mixed with cut straw.

WILBUR J. FRASER AND CASSIUS C. HAYDEN, **Alfalfa Hay versus Timothy, Hay and Alfalfa versus Bran, for Dairy Cows in Illinois.** University of Illinois, *Agr. Exp. Stat. Bull.* N. 146, pp. 129-144, Urbana, Illinois, June 1910.

United
States:
Illinois

Two causes influence unfavourably the production of milk in Illinois, one being the great production of Timothy (*Phleum pratense*) the ordinary

fodder of milch cows, and the other the high price of concentrated foods that may be used to make up the deficiency of protein in Timothy. Hence the more extensive cultivation of leguminosae would be advantageous. They would be more profitable and would furnish food much richer in proteid substances.

Experiments carried out with care by Mr. Charles Gilkerson, on a herd of cattle in the northern part of Illinois, have demonstrated that a ration of 10 pounds (4.53 kg.) of alfalfa hay in place of Timothy hay ensures an increase of 16% in the production of milk.

These results do not coincide with those obtained by other stations in Pennsylvania and Tennessee, according to which alfalfa meal and hay are slightly inferior to wheat bran for this purpose. However that may be, alfalfa hay is one of the best substitutes for bran for milch cows, who derive great benefit from it.

K. WIND. Toxic action of Chile Saltpetre on Cattle. (Ueber Chile salpeter-vergiftung). — *Deutsche-Landw-Rundschau*. Gr. Lichterfelde-Ost. October 1910, Nv. 13, p. 139.

Serious injury may be caused to domestic animals by the ingestion of nitrate of sodium. Cases of poisoning may be produced even when animals eat fodder containing some Chilian nitrate, or when sacks which have contained this fertiliser have been washed in the water that the cattle afterwards drink. Nitrate-poisoning very often has a fatal issue.

Germany

Supply of Light Horses in England. — *Journal of the Royal Society of Arts*. Vol. LVIII, N. 3019, p. 971. September 30th, 1910.

A light type of horse is required in England both for agricultural and military purposes. To encourage breeding to this type, the Board of Agriculture proposes an annual expenditure of £ 50 000 (1 250 000 frcs.), for the purchase of stallions and mares, for prizes, etc.

Great Britain

New Zebra Hybrid. — *Chasse et Pêche*. Bruxelles, 8 Oct. 1910. pp. 32-33.

During recent years investigations on the production of new and useful zebra hybrids have made progress at the Experimental Station of Bethesda (Maryland), connected with the Bureau of Animal Industry of the U. S. Department of Agriculture.

Hybrids between the ass and the zebra have been obtained for some time past, and it is hoped that they will prove fertile, which fact will be soon tested. An attempt has been made to obtain a hybrid of a zebra and a horse: a certain number of large mares have been chosen for this purpose.

A. RICHARDSEN. **Points in Judging Cattle in Sweden.** (Die schwedische Rinderzucht). *Landwirtschaftliche Jahrbücher*. B. XXXIX, H, 4/5, pp. 623-774, Berlin, 1910,

The methods followed in Sweden in judging stock for breeding is of interest.

Special importance is given to the record of production. For example, the following method is adopted for cows kept for butter, in the giving of marks for prize-classification:

Form of body	Maximum, 9 points
Pedigree	» 9 »
Production: for each 10 kg. of butter	» 1 »
Id.: for each kg. of butter per nutritive unit	» 1 »

Sweden

In 1910, the following method of assigning marks to bulls was introduced, this method already proving satisfactory:

Form of Body	Maximum points
Head, horns, neck and shoulders	3 points
Breast and withers	3 »
Loins and flanks	3 »
Bony frame and carriage	3 »
Hide and colour	3 »
	<u>15 points</u>

Pedigree: Breeding Value	
Breed	4 points
Colour	3 »
Paternal pedigree	5 »
Maternal »	3 »
	<u>15 points</u>

Productivity	
Milk production of dam	6 points
Id. of maternal family	3 »
Id. of paternal dam	3 »
Constitution and development	3 »
	<u>15 points</u>

Maximum total of marks. 45 points

An example of the results obtained is given by the Nasbylom herd, the biggest in Sweden, where the annual production per cow is 5233 kilogr.

of milk, containing 3.26 % of fatty substances, or 170.6 kilograms of butter. The breed is of the Tiefland stock, derived from the Dutch black-spotted cattle.

A record every three years at certain ages is sufficient, when it is completed by general data as to birth and years of lactation. The milk production record from the second to the fourth lactation inclusive, furnishes a good indication on future productiveness.

High Price in Argentina for Irish Shorthorn. — *The Farmer and Stock-breeder*, London. Oct. 17th, 1910, p. 1894.

Great
Britain
and
Ireland.
Argentina

In a sale of 32 Shorthorn bulls at Buenos-Ayres, the bull "Orphan Courtier" bred from the family of Irish Shorthorns the Orphan Luxuries, by the Right Hon. Fred. Wrench, fetched the second highest price of the sale: £ 1232, or 31 108 francs.

Slaughtering Cows in Argentina. (La matanza de animales vacunos). — *Revista de la Sociedad Rural de Cordoba*, Julio 1910, No. 229-230, pp. 5786-5787.

In the interests of cattle breeding, a heavy tax should be levied on the slaughtering of cows fit for breeding. At Buenos Ayres the cows sent to the butcher represent 37.78 % of the cattle slaughtered.

Argentina

Madagascar Cattle. — *Revue de Madagascar*. Paris, October, 1910.

There are 5 million head of cattle in Madagascar. The meat of these oxen, or rather *zebus*, is savoury and delicate; the average weight is 400 kg.; the net yield of meat, about 65 per cent, would be higher than that of French cattle. Arrangements are to be made for exporting Madagascar cattle to France.

Madagascar

Though the African cattle trade has been at a standstill for a long time past, there are nevertheless several other Madagascar products which could find a market in British South Africa: rice, maize, peas, and especially timber for railway sleepers.

The increase of agricultural exports from the port of Majunga shows that the agricultural produce of this province has grown considerably of late, and that the condition of trade is good. The increase is chiefly in hides, paddy, raphia, rubber and mangrove bark. Unfortunately, crops are frequently ravaged by locusts, sometimes so numerous as to cover tracts of land.

Mountain Sheep in England. — *Live Stock Journal*, Vol. LXVII, No. 1907, p. 443, London, October 21, 1910.

Great
Britain:
England

Oxford Downs are no longer so much in favour as formerly, and the Blackfaced Mountain Sheep, a much smaller breed, appears to be largely taking their place. The reason is that there is an increased demand for small mutton. This need not be disadvantageous to the farmer; but intending to breed the smaller sheep he must increase the number of his stock and keep up the weight per acre: otherwise there is risk of financial failure. The so called Scottish half bred, a first cross between the Blackfaced Mountain and the Border Leicester, is the best breed to adopt; although it presents all the peculiarities of a first cross and gives a very mixed-looking flock. the sheep put on flesh rapidly, and the meat is excellent.

A. FRIBOURG. Sheep "Transhumance", in Spain. — *Annales de Geographic*. May 15, 1910. *The Geographical Journal*. London, Oct. 1910 p. 490.

"Transhumance", the periodic migration of flocks between summer and winter pastures, is fostered by natural conditions in Spain.

The great contrasts of climate and soil and consequently of vegetation ensure successive pasturage for the flocks in different and distant parts of the country.

Spain

The long wars and disturbances which have always more or less agitated Spain favoured more the breeding of stock than settled farming, and when the conflict of pastoral and agricultural interests reached a climax, the powerful Association of shepherds and herdmen, "Mesta", long enjoyed royal protection, along with many special privileges. These privileges were abolished half a century ago, with the result that agriculture has increased and the migratory movement of cattle and sheep considerably diminished. In 1892 the number of sheep in Spain was reduced to half of the number in 1842.

The distribution of sheep in Spain, and the distribution of migrating flocks, are shown in two different maps.

Both show a stronger migration to the north than to the south of 40° N. latitude, but whilst the numerous flocks in the mountainous and well watered province of Navarre do not migrate, the less numerous flocks of the neighbouring province of Huesca must seek the wide winter pasturages along the Ebro. The chief migratory centres are regularly distributed on both sides of the winter pasture area.

The principal route followed by the flocks is from north to south across central Meseta. But railway facilities in the transport of flocks have now caused the old routes to be almost deserted.

A comparison is made of transhumance in Spain with that in other Mediterranean countries.

Lamb Shearing Experiments in New Zealand. — *Journal of the New Zealand Dept. of Agric.*, Vol. I, N^o 3, August 15, 1910, p. 217. Wellington.

There are great differences of opinion as to the shearing of lambs. The following experiment was made in 1909 at the Ruakura Experimental Farm, in New Zealand.

Twenty lambs were divided into two equal lots, one lot being shorn. At the end of 6 months the unshorn lot had gained 35 lbs. more than the other; the total gain at the end of 9 months being 74 lbs. Later, when the two lots were shorn, the unshorn lot gave an average of 2.1 lb. more wool than the other.

The following is the complete table of results:

LOT I (SHORN)

	£	s.	d.
First shearing, 25 lbs. wool at 7 per lb.	0.	15.	1 1/4
Second » 65 lbs. wool at 11 d. per lb.	3.	0.	6
518 lbs. mutton, at 3 d. per lb.	6.	9.	6
Total £	10.	5.	1 1/4

LOT II (UNSHORN)

77 lbs. wool at 11 d. per lb.	3.	19.	9
618 lbs. mutton, at 3 d. per lb.	7.	9.	3
	£	11.	9. 0

Gain in favour of unshorn lot £ 1. 3. 10 3/4.

SAINT-HILAIRE. The Cross Breeding of Dairy Sheep. — *Bulletin de la Direction de l'Agriculture*, 3rd quarter, 1910. Tunis.

The Sardinian sheep is the breed most in favour in Tunisian dairy farms.

A year after exportation, the Sardinian sheep lose in milk and are no longer remunerative. This has been also observed in Sicily, and Sardinian sheep are not imported as before into Sicily. By crossing Sardinian with Barbary sheep, a breed is obtained which is constant in milk yield and superior to the imported sheep in yield of wool and meat.

The Sardinian sheep is not satisfactory for the production of wool and meat, giving at most a kilogram of wool per year and when slaughtered yielding from 10 to 12 kilograms net of meat.

The Sardinian-Barbary cross, instead, produces 2 kilos of wool per year and from 18 to 20 kilos of meat.

New
Zealand

Tunis

Goat-Breeding in Southern Mexico. — *Bulletin of the Pan-American Union.*
Washington, October, 1910.

Mexico

The breeding of goats is steadily increasing in Southern Mexico on account of the growing demand for skins. Waste lands were formerly used for pasturing the goats, but the use of better lands for this purpose is more profitable.

H. MARTEL. Preservation of Meat by Freezing or Refrigeration. — *Revue Scientifique.* Paris, October 22, 1910, No 17, p. 527.

France

Low temperatures are not suited to all meats alike, each kind should be preserved at special suitable temperatures.

Temperature for prolonged preservation Centigrade degrees	Kinds of Meat
— 10°	Beef, mutton.
— 7° . 5	{ Russian hares; Fowls for broth; Legs and chines of reindeer, roe-buck.
— 5°	Salted ox-tongue.
	{ Fish: salmon, soles. Lobster and other crustaceans;
— 3°	{ Hams in barrels; Turkeys; Pheasants, young pullets, partridges, grouse; Pickled meats, herrings, caviare; Cooked hams in tins;
0°	{ Ox-cheek; Potted chicken; Sardines in oil.
Some degrees above 0° . .	Butcher's meat, sausages etc.

Frozen meat loses much less weight than meat kept in a refrigerator.

Preserved leg of beef	Loss p. 100
Meat frozen at — 20° (3 days) and — 5° (47 days).	4.5
» at — 5° (50 days)	4.6
Meat refrigerated — 2° (3 days) and + 2° (47 days).	10.0
» + 2° (50 days).	13

The use of frozen meat has not spread in France, attempts to introduce it having failed. In other countries there is obviously a tendency to substitute frozen by refrigerated meat; numerous slaughter-houses in Ger-

many have refrigerators, and the British import trade also inclines towards refrigerated meat, with or without the addition of preservatives (Formol, etc.).

Refrigeration at $+ 1^{\circ}$ keeps beef sound for fifteen days, even if the atmospheric moisture conditions are not the best (75 to 80° hygrometric degrees). Experiments in 1902, 1903 and 1904 by the Commission for the Study of Refrigeration Processes appointed by the French War Office showed that the first signs of mould (*Penicillium* and *Aspergillus*) appeared after 15, 17 and 22 days; but this effect was retarded by lowering the temperature to $- 1^{\circ}$, when it was observed that the meat kept sound from 12 to 30 days.

Refrigeration, like freezing, destroys the parasites in the muscular tissues. Cysticerci, the larval forms of the human tape-worm, are destroyed by three weeks refrigeration at $+ 2^{\circ}$.

Some food stuffs should never be preserved except in cold chambers, raw chopped meat, so easily spoilt, belonging to this class. It is a question which certainly deserves further investigation.

We note the following concluding remarks:

- 1) Governments should encourage in every way the institution of refrigerators in public slaughter-houses, markets and even in butchers' shops.
- 2) In warm climates where cysticercose or tape-worm is frequent, the use of refrigerators should be particularly enforced for meat intended for potting, for local consumption, and for fresh meat to be exported.
- 3) Permission should be refused for the sale of raw chopped meat except to shops provided with refrigerators.
- 4) Public institutions, as hospitals, etc. should require guarantees testifying that the meat supplied them has been kept in refrigerators under proper conditions of temperature, of moisture etc.

J. MACMEIKAN. **New Freezing Process for Butcher's Meat.**—*Revue générale du froid*. Paris, October, 1910, No. 17, pp. 625-626.

By this new process freezing is obtained by cold sterilised air, at a temperature not so low as usual. France

As soon as the animal is slaughtered the carcass is washed in sterilised water and hung up to drain for from 6 to 10 hours, according to the outside temperature. The carcass is then put in the refrigerator, where it is exposed to a current of cold sterilised air ($+ 4^{\circ}$ C.) for 6 hours.

Frozen Meat and Butter Exported from Victoria in 1909-10.—*Bulletin mensuel de l'Office de Renseignements agricoles*, Sept.-Oct, 1910.

The frozen meat and butter trade is developing considerably in Victoria. In addition to local consumption, 17 000 tons of butter were this year sent

Australia:
Victoria

abroad and to the other States of the Australian Confederation against 9 402 tons last year. The frozen meat trade is an export trade only. In 1909-1910, 1 097 432 sheep and lambs were exported, the number for the previous year being 651 890. There were besides 8 766 bullocks exported, 4 639 calves, 8 581 pigs, and 13 480 tins of preserved meat.

The meat is stored in the Government refrigerators. It is expected that the quantities of butter and meat refrigerated next season will be quite as high as they were last year.

C. H. FRANCIS and PERRY F. TROWBRIDGE. **Phosphorus in Beef.** — *J. Biol. Chem.* 1910, 8 81-94; *Journ. Chem. Soc.*, Sept. 1910, Abs. 792.

United
States

The conclusions are drawn from a large number of analyses of the different organs of several calves and bullocks. The results were uniform for young animals, but variable for older ones. The phosphorus-compounds are proportionally more abundant in the circulatory and nervous systems. Lean animals give a meat generally poorer in phosphorus-compounds.

G. FASCETTI. **Dairying.** (*Caseificio*). Ulrico Hoepli, edit., Milano, 1910, pp. 2-543.

Italy

This handbook deals with dairying in Italy. It is divided into five parts, which treat respectively of milk, cream, butter, cheese and by-products. Information is given on the organisation of the dairying interests and business in Italy.

Inspection of Cattle Sheds and Dairies in New Zealand. — *Journal of the New Zealand Department of Agric.* Vol. 1, No. 3, August 15, 1910, p. 212, Wellington.

New
Zealand

When the New Zealand Department of Agriculture was reorganised, the work of giving instruction and of inspecting dairy farm premises was assigned to the Dairy-produce Division. Since April 1910 the inspectors have visited from 2000 to 3000 farms, interviewing the owners in regard to improvements. Many cattle-sheds have been repaired and made more healthy; drainage and water supply attended to, and concrete floors laid down where possible. In many cases the dairies have been removed further from the milking sheds and yards, or will be removed shortly.

The inspectors often allow as long as three months for carrying out the improvements and have been throughout on the friendliest terms with the farmers. There is every reason to believe that this new system will greatly benefit dairying interests, contributing to produce better and cleaner milk and therefore more valuable dairy produce.

A Milk Purifier. (*Eine neue Milchreinigungseinrichtung*). — *Milch-Ztg* October, 1910, No 43, p. 505-506 (With two figures).

The serious dangers that may arise from impure milk, both when used as milk and when transformed into butter and cheese, are dealt with in this description of a milk purifier, which is formed of cloth filters through which the milk is drawn by a pump. In this apparatus several filters varying in thickness may be placed one above the other.

Germany

Ropy or Slimy Milk. — *The Farmer and Stock-breeder*, No. 1101, vol. XXIII. October 31, 1910, p. 1969, London.

Viscosity is relatively common in milk and may be caused either by bacteria or by a disease of the cow's udders. Ropy milk is very much appreciated in some parts of Europe, and good milk is sometimes made ropy by being put into a vessel that has previously been lightly rubbed with butterwort (*Pinguicula vulgaris*), a plant which always has the *Bacillus hollandicus* adhering to its leaves.

Great
Britain

Ropy milk is sometimes used to make Emden cheese.

In England, viscosity is looked upon as a defect, and every effort is made to prevent it. If the ropiness appears immediately after milking, it is obviously due to a disease of the udders, and in that case the milk ought not to be used for food. If, on the contrary, the ropiness does not appear until from 12 to 24 hours after milking, it is probably due to the *Bacillus lactis viscosus*, which is often present in the water used for washing the cans. The remedy is to use pure water and to sterilise the cans with boiling water or steam.

G. LECOMPTE and R. LAINVILLE. New Method of Making Milk Powder. (*L'industrie laitière belge*); *L'industria lattiera e zootecnica*. Reggio Emilia, October, 1910, No 20, p. 379.

The dry matter is separated from the water by freezing the milk. The method described may be used both for fresh, and partially or completely skimmed milk. Freezing does not cause caramelisation, nor that *cooked taste* sometimes observed in milk powders prepared by heating.

Belgium

N. GERBER. Catalytic Actions of Enzymes in Milk (Katalase). — *Milch Zeitung*, 1910, No 28, p. 255.

A new and rapid method is suggested for finding out whether a sample of milk comes from a healthy animal. The method is based on the catalytic property of certain enzymes on hydrogen peroxide. If a certain amount

Switzerland

of milk is mixed with a given quantity of hydrogen peroxide the amount of oxygen given off will reveal the presence of catalytic agents, *i. e.* the secretion from germs which are more or less numerous according to the impurity of the milk.

By using the apparatus suggested by M. Gerber, it is possible to ascertain whether the milk is fresh. Infections of the mammary glands may also be discovered without clinical tests.

TH. SAMES. **Some Colorimetric Reactions for distinguishing Raw from Heated Milk.** (Ueber einige Farbereaktionen zur Unterscheidung der erhitzten von der rohen Kuhmilch). — *Milchwirtsch. Zentralblatt*, October 1910.

Germany The question as to whether milk contains enzymes decomposable by heating is important and has been much discussed.

Of these enzymes the *reductases* and the *oxydases* are particularly interesting; the first are generally recognised by the reaction of methyl blue, the second by the reactions of guaiacum tincture, benzidine and paraphenylenediamine. These reactions are studied by the writer together with Scherdinger's modified reaction with methyl blue and formaldehyde. The conclusion is reached that for testing milk to verify if it is raw or heated satisfactory results are obtainable by employing all these reactions together and not relying on one single test.

“Fucoma”: **An apparatus for the Rapid Testing of Milk and Cream.** (“Fucoma Schnellapparat” zur Milch und Rahmunteruchung von der Firma P. Funke, Berlin). — *Milch Ztg.*, Leipzig, October 1910, No 44, p. 517-518.

Germany A new milk-testing apparatus is described and illustrated by several figures.

R. BINAGHI. **Hygromipisimetry, a New Method of Testing Skimmed and Unskimmed Milk.** — *Rev. Gen. du lait*, Brussels, Oct. 1910, No. 16, pp. 361-371.

Italy The term *Hygromipisy* (*hygromipisie*) is used as describing the condition of two miscible liquids of different density and capable of mixing, when in contact, their respective contact-surfaces being in superposed planes. This physico-chemical condition has been investigated by professor Capparelli from a biological point of view. The degree of hygromipisy is measured by means of an apparatus called *hygromipisimetre*, constructed by Capparelli.

Using milk as the descending liquid and a 0.20‰ fuchsine solution as the ascending liquid, Mr. Binaghi has applied Capparelli's method to compare different milks, as those of the goat and of the cow. Binaghi observes that the quantity of fat in the milk exerts a great influence on the rate of hygromipisimetric time, and suggests the use of Capparelli's method for detecting fraudulent skimming in milk.

P. DORNIC. **Butter Making in the Charentes and in Poitou, France.** — *L'industrie laitière*, No. 41, Paris, 9 October, 1910, p. 663 sgg.

The report on dairying in the Charentes and in Poitou shows its growing importance. From 1908 to 1909 the production of milk in this district increased by 13 0/0.

France:
Charentes
Poitou

There are 115 cooperative dairies with an average of 600 members each. The cows, which give a fair average of milk (1900 litres a year in the Lower Charente) are carefully fed. Thanks to good organisation, the pastures are being improved, the produce increased, expense reduced, and a larger profit netted. The butter output is also very considerable (13 million kg). Competition encourages emulation and removes the prejudices of the peasants.

The average income from each cow in this district is estimated at 208 frs. a year, the annual amount of milk being 1600 litres, representing 75kg of butter, giving the milk a value of 13 frs. per hectolitre.

Crumbly Butter. — (Kurze, bröckelige Butter). — *Fricks Rundschau*, October 5th, 1910.

In November and December butter is often crumbly. This is due not only to imperfect methods of butter-making and a too low temperature when the milk is skimmed, but also to feeding the cows with sugar beet tops. Pulse and linseed, cocoa and cotton oil-cakes also affect the consistency of the butter, so that, when the defects are not due to the method employed, it is advisable to substitute the above foods, at least in part, with corn meal and colza oil cakes.

Germany

COSTANTINO GORINI. **Proteolytic and Acid producing Cocci in Cheese.** — *Revue générale du Lait*, Brussels, Sept. 1910, No. 15, pp. 338-346.

Amongst the bacteria which produce acid and cause proteolysis in cheese there are some which do not show proteolytic action in gelatine cultures. This suggests that these cheese-bacteria must be much more abundant and their action more important than would be shown by the usual bacteriological testing of cheese by gelatine plates. In the ripening of certain cheeses,

Italy

Emmenthal and Cheddar, these micrococci play an important part. They may be recognised and determined by their peptogenic action in milk cultures. *Micrococcus casei acido-proteolyticus* is the name suggested for the Cocci inducing acidity and proteolysis.

S. M. BABCOCK. Low Temperature in the Making and Storing of Cheese.

(Ueber die Anwendung niederer Temperaturen bei der Behandlung von Käse und bei dessen Aufbewahrung). — I. Intern. Kältekongress in Wien, 6-12 Oct. 1910. *Chemiker Zeitung*, Jahrg. XXXIV, No 126, p. 1127. Cöthen, Oct. 22, 1910.

Numerous experiments on this subject have been made at the Experimental Stations of Wisconsin, Iowa, New York, and in Ontario.

United
States:
Wisconsin
etc.

Canada

It is generally believed that cold is harmful to the ripening of cheese, causing a bitter taste. The experiments described in this paper show that, on the contrary, a judicious application of cold may improve the flavour. Moreover cold may prevent certain changes due to bacterial action, such as "eyes" in Swiss cheese, the characteristic taste of Limburg cheese and mouldiness in Roquefort. When these changes occur, the best way of preserving the cheese from further harm is to store in a refrigerator.

P. LEBROU. Cold Storage and Cheese Making in the Aveyron, France. —

L'Industrie laitière. Paris, October 1910, No 43, p. 695-701.

France

The cold-storage in the Department of the Aveyron is of importance only at Roquefort, where it serves for the preservation of the celebrated cheese, the production of which in 1908 was 9 000 000 kg., valued at 30 000 000 francs. Roquefort cheese is made from unskimmed ewe's milk, fermented at low temperatures. The action of cold in the cellars where the cheese ripens delays fermentation, putting it under control. Roquefort cheese is wrapped in silver paper to keep it from the air, and may be kept for 8 or 10 months without deterioration. The temperature in the cellar is about 0° C.

F. W. J. BOEKHONT and J. OTT. DE VRIES. Two Defects in Edam Cheese.

— *Revue générale du lait*. Brussels, Sept. 1910, Nos 14 and 15, pp. 313-325 and 347-356.

Holland

Boekel's cracks (*fentes de Boekel*) are lenticular gaps with scaly walls, formed in certain Edam cheeses made all in one piece.

The gases in this cheese and in that with rounded holes have the same composition. The forming of lenticular gaps can therefore only be explained by the fact that the plasticity of the paste has been modified, the cheese with round holes being of greater plasticity than that with Boekel's cracks.

The writers have shown that this "short" cheese or *fromage court* is caused by a want of plasticity resulting from a hard, brittle, chalky paste, called "short" or *courte* paste. This seems to be due to the formation of bilactate of paracasein, which is insoluble in the saline solution found in Edam cheese.

Another salt, monolactate of casein, is simultaneously formed in the cheese, and it may generally be said that the plasticity of a cheese varies directly with its content of monolactate of paracasein and inversely with its content of bilactate of paracasein. By adding a certain quantity of water the forming of cracks in Edam cheese may be prevented.

Knijpers. Are cheeses, which have a large crack right through the centre, only the rind remaining whole. The study of the gases and plasticity of these cheeses leads to the conclusion that the crack is caused by the large amount of gas and is connected with the conditions of plasticity of the cheese-mass.

The Consumption of Cheese in Egypt. (Der Käsewarenbedarf Ägyptens). *Milch Zeitung*. Leipzig, October 1910, No 43, p. 507.

Cheese-consumers in Egypt are nearly all Europeans for whom cheese is imported from Italy, Greece, Crete, Cyprus, Switzerland and Holland. A cheese of the Swiss type is now being made in Germany for exportation to Egypt. Information respecting the trade in this product is given.

Egypt

JOSEPH B. BOLGAV. The Wool Industry in Hungary. — *Textile World Record*. Lord and Nagle Co., Boston, Mass. Oct. 1910, p. 104.

Hungarian sheep supply the trade with the finest raw wool.

The annual production of raw wool exceeds 200 000 cwt. (to 160 000 kilograms.), and includes the finest qualities, such as merinos, cross breeds and mohair.

Hungary

One third of this output is washed in Hungary, generally by hand, only 35% being washed in factories. About the same proportion of the raw material, namely one-third, is manufactured in Hungary.

Diminished Wool Production in Russia. (*Bulletin of the Trade Journal*). *Bulletin de l'Office du Gouvernement de l'Algérie*, Paris, October 1, 1910.

The progressive transfer of large tracts of pasture land to the peasantry who, by help of the Peasants' Bank, farm them as small holdings, has diminished the number of sheep in Russia to an extent hardly balanced by the increase of flocks in Siberia. The gradual decrease of the wool output is due to this change, and the breeding of a special race of sheep which grow better wool goes but a very short way towards making up the deficiency.

Russia

EARLE. Packing of Wool in South Africa. — *Bulletin de l'Office du Gouvernement de l'Algérie*, Paris, October 15, 1910.

South
African
Union

Mr. Earle classifies South African Wools under five heads. Wool should always be sheared and packed while dry; nothing repels a buyer so much as damp wool, and goods so packed lose in weight, deteriorate and become discoloured. It is to the interest of South African breeders to sell on the spot rather than through Continental markets.

Production and Trade in Peruvian Hides. (Produzione e commercio delle pelli nel Perù). — *Bollett. Uff. dell'Associazione it. dell'Industria e del Commercio del Cuoio*, Torino, Ottobre 5, 1910, p. 760.

Peru

The importance of this industry is increasing, and the export and local trade is improved in every way. The hides come from large breeding centres in the interior. Those from the slaughter-houses of Lima, where the consumption is greater than in any other part of the country, are not exported, but are used by local industry.

The goat and kid hides of Piura are highly valued for suppleness and strength, and the ease with which they can be tanned; they serve generally for gloves. The hides from the arid districts of the Sierra are sun dried and exported, but most of the exports come from the coast districts. Very few sheep-skins are exported, being mostly utilised on the spot. Nearly all the kid skins are sent abroad, those from Piura being all bought by the United States. The principal market for Peruvian skins is the Havre, 80 per cent of the whole production being bought by France. Prices vary according to the localities where the skins are sold and the conditions of the market.

The weight of the hides varies; those from the coast districts being heavier than those from the interior. The average weight is from 50 to 60 lbs for salted damp hides. They are bought direct from the breeders who have agents in Europe. The skins are generally small, but uniform in quality and rather ragged.

RAYMOND PEARL and FRANK M. SURFACE. Conditions Influencing the Fertility and Hatching of Eggs. — *Thirty-Fifth Annual Report of the Maine Agric. Exp. Station*, 1909, pp. 105-184. State of Maine, 1910.

United
States:
Maine

Interesting studies have been made in the poultry section of the Experimental Farm of Maine on the conditions influencing the fertilisation and hatching of eggs. When like treatment and identical incubating systems have eliminated the possibility of error, hereditary characteristics can be distinguished from those due to surroundings.

The percentage of eggs which hatch may be determined by feminine descent and perhaps also by the male line, and may therefore be improved by selection. The degree of fertility is not hereditary, but in each individual depends on the treatment and several other circumstances: temperature, the situation of the fowl house, etc.

Among the factors that tend to produce fertilised eggs, with a high percentage of hatched chicks, the following may be mentioned, although the data are as yet rather scanty. Anything which tends to lower vitality, acts unfavourably on the development of the embryo, as for instance abundant winter laying, a purely meat diet, etc. There should be individual selection, because under identical conditions some individuals readily transmit to their offspring the marked characteristics they possess, while others with the same characteristics fail to do so.

As there is a direct relation between the percentage of eggs hatched and the total number laid, the advantage of this kind of selection is doubled. Rational treatment and elimination of individuals not presenting or not transmitting the desired characteristics, may thus produce a good fertile type of hen.

Poultry Farming in New York. — *Weekly Globe and Canada Farmer*. Oct. 5, 1910. Toronto.

The New York Legislature having voted \$ 90 000 for the purpose, Cornell University has decided to enlarge its plant for the teaching of poultry raising; a fifty acre farm is to be added, with a fine building attached. The farm is to be used for experiments and for practical instruction. Cornell University is also to have a professorship of poultry farming.

United
States:
New York

L. VANDER SNICKT. **The Braekel Hen.** — *Chasse et Pêche*. Brussels, October 29, 1910, XXIX, No. 5, p. 98.

The Braekel hen, celebrated for the size and number of its eggs, is known in England under the name of *Campine*, an error which dates from the introduction of the Campine into that country. The secretary of the English Campine Club, the Rev E. Lewis Jones, and Mr. Oscar Thomaes, President of the Belgian Braekel Club, have together studied the origin of the type adopted by the English Campine Club, and have found that the Stud Books of the English and the Belgian Clubs have the same origin. The variety of Braekel which lays the biggest eggs is found at Alost.

Belgium.
Great
Britain

Ostrich Breeding in Madagascar. — *Revue de Madagascar*. Paris, Oct. 15, 1910.

The settlers in the Majunga district are at present trying to acclimatise the ostrich, and at their request an experiment in breeding is to be made at

Madagascar

the agricultural experiment Station of Maxovoay. Ostrich raising on large farms, which is the rule at the Cape, does not seem very practical in Madagascar, owing to the nature of the country and the uncertain character of native labour. It is proposed to introduce into Madagascar the method of breeding used in Somaliland, where tame ostriches are often put to pasture with the cattle. A few ostriches could be assigned to the native shepherds along with the cattle, and ostrich raising thus be rendered inexpensive.

Raising Ostriches in the Transvaal. — *Nature*, No. 2139, vol. 84, p. 513. London, Oct. 27, 1910.

The Transvaal Department of Agriculture is actively suggesting new industries and new crops that might be developed, and recently, its *Journal* (vol. VIII, No. 32) discussed the question of raising ostriches in the Transvaal and mentioned several localities where this industry might well be successful.

The Progress of Sericulture in Madagascar. — *Bollettino di Sericoltura*. Milan, November 5, 1910.

The natives are becoming every day more interested in raising silk-worms, which are really profitable; the fairs in which prizes are given to the best lots are gaining in importance. More than 800 native breeders exhibited cocoons at the last fair.

Europeans are also interested in this industry and thirty European establishments have received prizes from the French authorities. The future of this industry in Madagascar is assured.

Sericulture in Tonkin. — *La Quinzaine Coloniale*, N. 18, Paris, 1910.

This has been a good year for silk raising, and more than 3 million lays of eggs have been distributed gratis. The demands of the native in fact exceed the supply, and it is probable that branch establishments for the production of eggs will shortly be opened to supply the silk raising centres which are developing in various parts of the Colony that are distant from the Station at Phu-lang-Thuong.

Some stocks recently bred from French, Canton and Annamite crosses have given a kilogram of cocoons from two lays; the average number of cocoons to the kilogram was 630, and 13.5 kilogram of cocoons yielded a kilogram of silk, whilst the pure native breeds require four lays for one kilogram of cocoons, of which 1200 to 1300 go to the kilo. For one kilo of silk 22 to 23 kilogr. of native cocoons are required. The Government has just voted premiums for the importation of raw silk from the colonies.

South
African
Union:
Transvaal

Madagascar

French
Indo-China:
Tonkin

Progress of Sericulture in Tonkin. — *Bollettino di Sericoltura*. Milan, Oct. 29th 1910.

Sericulture in Tonkin has made enormous progress thanks to the joint action of the Government and of a private Company. The output increases whilst the quality improves. Silk-weaving by machinery has already been introduced. The development of sericulture has given rise to great prosperity in the country, the inhabitants never having handled so much money as now.

French
Indo-China :
Tonkin

Sericulture in Bengal. — Department of Agriculture, Bengal. *Quarterly Journal*, vol. IV, n. 1, pp. 26-31. Calcutta, 1910.

A very important experiment has been made in Bengal for improving the silk industry. The seed-cocoons are placed in cold storage, at a temperature varying from 40° to 72° F.

The issue of the moths from the cocoons and the laying of eggs has been retarded by 7 to 9 days by means of repeated changes of temperature, thus making it easier to answer the requests of the different breeders for fresh seed.

British
India :
Benga

The microscopical examination of the moths from seed cocoons kept in cold storage show that they are very healthy, the worms produced being stronger than usual, and their cocoons heavier and less liable to disease than those raised in the ordinary way. There is a steady demand for eggs from cold storage-cocoons.

M. MORAND. **Cold Storage in the Silk Industry.** — *La Revue générale du froid*, October, n. 17, pp. 592-597. Paris, 1910.

Cold is necessary for the development of the embryo in annual silk-worms' eggs; and by the application of cold, making a sort of artificial winter, the Chinese of the North get two crops a year. The Japanese get three crops by the same means: one in spring, one in summer, and a third in autumn.

China

From 2 027 339 koku (1 koku equal to 180 $\frac{1}{2}$ litres), in 1897, the yearly Japanese crops have increased to 3 530 770 koku in 1908.

H. GEARY. **Bees for Profit and Pleasure.** — (*Farm and Garden Handbooks*, T. Sanders, pp. 114, London. W. H. and L. Collindridge) *Nature*, No. 2137, Oct. 13th, 1910, pp. 464-465.

Great
Britain

"This is a practical treatise on bee-keeping, written by an expert. The advantages of bee-farming, both as a recreation and an auxiliary source of

profit, are dwelt on; there is a clear and concise account of the natural history and habits of the bee, and a description of the different kinds of hives and other apparatus.

The instructions which the author gives with a view to ensuring success are interesting and precise. The book is provided with an index."

AUZINGER. Importance of Honey Ferments in the Analysis of Honey.

— *Bull. Ass. Chim.*, 1910, 1244; *Annales des Falsifications*, No. 24, October 1910, Paris, p. 450.

France

There are a number of diastatic, proteolytic and inversine ferments in natural honey, which give it its nutritive value. These enzymes are destroyed at a higher temperature than 70° C. and do not exist at all in artificial honey. The article treats of methods of investigating characteristic ferments, and recommends that they be applied together with usual chemical analysis.

F. ARONSSOHN. The Cell Composition in different Regions of a Bee Colony. — *L'Apiculteur*, Paris, No. 10, October 1910, pp. 380-382.

France

Prof. Desgrez, investigating whether bees modify the construction of their cells when the latter have been destroyed, observes:

- 1) That bees of the same hive, and working at the same time, produce a wax not constant in composition.
- 2) Bees add foreign matter to their wax, in proportions which vary according to the kind of cell they are building.
- 3) The combs that have contained larvae are of a special composition, rich in non-saturated compounds; this peculiarity is probably acquired after construction.

Production of Beeswax in India. — *La Quinzaine Coloniale*, Paris, N° 18, 1910.

British
India

Although there are three species of bees, the *Apis dorsata*, *A. indica* and *A. florae*, which produce the wax exported from India, the products are of the same composition; they differ slightly from European wax, chiefly in acidity, which is lower. The wax is gathered from rocks and trees (in all parts of India and Burma) by jungle-tribes. Turmeric powder is often added to the wax after it has been purified, to give it a brilliant yellow colour.

Production of Beeswax in Africa. — *La Quinzaine Colon.*, Paris, N° 18, 1910.

Africa

A species of bees common in Europe the *Apis mellifica*, is met with all over Africa, from Egypt to West Africa and southwards to the Cape,

but bees are not kept by the African natives, except by the fellaheen of Egypt. There has been an important exportation of wax for some years from German East Africa.

Wild bees gather much of their honey from *Manihot Glaziovii*.

Some Uganda chiefs have been studying the production of wax in East Africa and have set up several thousand hives, many of which are well stocked with bees.

Large quantities of wax are gathered yearly in the districts of Kambo and Fogni and exported from Gambia.

Protecting the Elephant in French Central Africa. — *La Quinzaine Coloniale*, Paris, No. 18, 1910.

The Lieutenant-Governor of Ubangui-Chari-Chad has forbidden the trapping of elephants. These animals are in danger of extinction. It is to be hoped that this prohibition will be obeyed, because the elephant is a very valuable animal. Its preservation depends on the vigilance of the colonies interested.

French
Central
Africa

Destruction of East African Birds. — *Travel and Exploration*, Oct. 1910. London.

Among the feathers exported from German East Africa for millinery are those of the king-fisher, the bright-feathered starling and the turacos. A German named Grote has asked his Government to prohibit this trade, or at any rate to put a stop to the shooting of these birds during the nesting season, when their plumage is at its highest beauty. Mr. Grote suggests that permission to take the birds at that period be given only to naturalists and collectors for museums. The other Governments of Tropical Africa would do well to adopt the same measures. It has been possible to protect the rarer species of big game by international agreement; the same should be done for the gay-plumed birds, not less interesting than antelopes and okapis

East
Africa

Importation of Partridges into England. — *The Times*, London, October 5 1910, No. 39395, p. 19.

The importation of partridges from the Continent or elsewhere, chiefly from Germany and Austria, has developed a considerable trade during the past few years. These birds are very similar to the common English species. Russian and even Manchurian partridges are sent to the London market in cold storage, and some have been exported this year from Budapesth to England for the first time.

Great
Britain:
England

Fish Culture in the Lüneburg Heath, in Germany. (Fischzucht in der Lüneburger Heide). — *Deutsche Rundschau für Geographie und Statistik*, Wien, Sept. 10, 1910.

Germany

The improvements in the water-courses of the Lüneburg Heath have greatly increased the quantity of fish in them. One fisherman has already caught 1778 lbs. of trout.

Fine Galician carp are being bred in these waters in the place of the valueless native carp. Whereas formerly there were only 600 *Morgen* (1) of trout ponds there are now 7000. Modern methods are being adopted for stocking these waters, and the breeders artificially feed the fish.

The Salmonidae of Bosnia-Herzegovina. (Die Salmoniden Bosniens und der Herzegovina). — *Oesterreichische Fischerei-Zeitung*, Wien, October 15, 1910.

Investigations in the Narenta and its affluents, between Mostar and Gravaticovo, as well as in the Lake of Boski, have shown that these waters abound in three species of Salmonidae: *Trutta fario* L., *Salar obtusirostris* Heck., and *Salar genivittatus* Heck.

Austria
Ungary:
Bosnia
Herzegovina

The same Salmonidae of the Danube, are found in the Bosna, an affluent of the Sava. There are two interesting varieties of the *Trutta fario* in the Lake of Pliva, one with silvery and the other with golden scales.

Agricultural Industries.

Wine Production in Australia. (La produzione del vino in Australia). — *Bollettino del Ministero di Agric., Ind. e Comm.*, Roma, 1910, fasc. 4^o, serie B.

Australia

Information is given on the vine area in Australia, where the climate and soil in some parts are very favourable to this culture. Of late the pro-

1) The Prussian *Morgen* is equal to 2553 m.² a little more than a quarter of a hectare. [Ed.].

duction has been very abundant relatively to the area cultivated. A considerable amount of grapes is not made into wine, but is used for the table, or dried for currants. Consignments of fresh grapes are sent to England, packed in cork chips, during the seasons when grapes are not to be had elsewhere.

Much alcohol is added to Australian wines.

Phylloxera has caused much damage, but the Agricultural Departments have acted with energy importing phylloxera resistant American vines.

GAUTRELET. The Physiological Action of Sulphur Dioxide in White Wines.

— *Progrès agric. et viticole*, No. 44, Montpellier, Oct. 30, 1910. p. 539-546.

The use of sulphur dioxide in wine having caused much discussion, several experts have studied its action on the human organism. Experiments were made in 1895 by Leuch and in 1907 by Wiley, but the former used wines containing concentrated sulphur dioxide, the latter aqueous solutions or capsules of sodium sulphite, neither of which in conditions suitable to the problem under consideration. The *Syndicat de la Propriété et du Commerce de la Gironde*, influenced by Wiley's unfavourable opinion, appointed a Committee to study the subject thoroughly. A series of tests were accordingly made on animals and on man.

France

Some dogs received:

1. wine containing 100 milligrammes of free sulphur dioxide per litre;
2. wine containing 400 mgr. of sulphur-dioxide, 100 mgr. of which was as free sulphurous acid and the rest combined;
3. an aqueous solution of sulphurous acid (100 mgr. per litre of water).

The dogs were first kept some time under observation, then studied under the influence of ordinary wine (10 cc. per kg. of live weight); lastly, under the influence of sulphurous wine, the same dog being used for each test. The urine was collected with care, the appetite observed, and the animals frequently weighed; the main elements of the blood were also determined. It was found that notwithstanding the fact that wine is an unusual beverage for dogs, it increased nitrogen dis-assimilation, sulphur dioxide acting rather as a corrective. The liver and kidneys acted well, there was no sign of albuminuria, and there was absolutely no morbid change in any organ, nor destruction of blood globules. In fact, the dogs stood the tests very well and sulphur dioxide proved perfectly harmless.

As to the experiments on man, the Committee chose 9 healthy persons of average constitution, accustomed to wine, and had them shut up in a sanatorium for 30 days and submitted to a carefully calculated diet. Three of these persons drank only pure wine, while the other six took the same wine for six days and, for the next twelve, wine containing 100 mgr. of sulphur dioxide and 300 mgr. of combined acid, at the rate of 15 cc. per kg.

of live weight. During the following 6 days the quantity of sulphurous wine was carried to 20 cc. per kg. of live weight, which amounted to 1.300 litres to 1.600 per individual. Finally, for the last 6 days, a flask of 90 cc. of Sauterne wine containing more than 400 mgr. of sulphur dioxide per litre, was added to the former amount.

The health of the patients remained excellent, and their weight and temperature did not vary; the haemoglobin of their blood as well as their sight remained normal, the liver was not congested, and the bowels were in good condition. The urinary elements varied but very little, only the amount of sulphates increased: which showed that the sulphurous acid is eliminated under the form of inorganic and not organic combination. There was no trace of albumen in the urine, or other sign of kidney trouble, nor any diarrhoea.

The Committee is convinced of the complete harmlessness of white wines containing as much as 400 mgr. of sulphur dioxide. This conclusion justifies the old established use of sulphurous acid in preparing white wines.

HORACE T. BROWN. **The Nitrogen Question in Brewing.** — *Journal of the Institute of Brewing*, vol. XIII, p. 394; *Monit. Scientifique*. Paris, Jan., Feb., April, Oct. 1910.

Researches were made:

1) to determine variations in the quantity of assimilable nitrogen in wort, caused by variations in composition of the raw material and changes in the processes followed.

2) to investigate the conditions concurring to eliminate nitrogen during fermentation.

As the ratio between assimilable and soluble nitrogen remains constant under the same conditions of malt extraction, the investigation may, in certain cases, be restricted to a study of the conditions which increase or diminish soluble nitrogen, viz, the nitrogenous compounds not precipitated by boiling. There is a close connexion between the original amount of nitrogen in barley and the quantity of soluble nitrogen contained in the malt obtained from the same barley, when the conditions of extraction remain the same. Barleys of the same class (and therefore comparable) are those of the same variety, grown as far as possible under similar climatic conditions.

The following are the points of most practical interest among the many conclusions to which these lengthy investigations have led:

1) The temperature during brewing has little effect on the extraction of the soluble and assimilable nitrogen of malt.

2) any attempt to increase the extraction by excessive watering,

especially at high temperatures, causes increase of soluble nitrogen in the extracts.

3) hops, far from diminishing assimilable nitrogen, as generally believed, increase it slightly.

An International Commission appointed to examine 800 samples of barley, recently exhibited in Berlin, assigned the highest marks to the barleys poorest in nitrogen. This method of classification of malt-barley is followed in Germany but not so much in Great Britain or in America.

Mr Beaven, in the discussion on Mr Brown's paper, at the Brewing Institute, in reporting the German method of classifying malt-barleys, expressed his disagreement with Mr Brown on the question of the proportion of nitrogen dissolving in the boiled wort, which would not remain a constant fraction of the primitive nitrogen in the barley.

This nitrogen question should not be neglected in ale brewing; but its importance is probably not equally great in the case of porter-brewing.

L. LEVY. **Use of Resin in Distilleries.** — *Bull. de l'Association des Chimistes de sucrerie et distillerie.* Paris, Sept. 1910, N, 3, pp. 195-197.

The use of resin (*résinose*) in the distillation of beets and molasses has been studied at the Agricultural Industrial School of Douai.

Resin must be used differently from antiseptics. When fermentation has begun it may be used in smaller quantities than at the beginning; it is better to add it when fermentation is active than later on, because it is only a clarifier and not an antiseptic, and can only eliminate the microbes when they have had time to develop. It does not interfere with their production, but makes the cells heavier, precipitating them. This process effects a great saving in the amount of the sulphuric acid employed, as usual in agricultural distilleries. With resin the fermentation becomes more regular and the yield in spirit is consequently greater.

France

The Sugar Industry in Panama. — *Feuille d'informations du Ministère de l'Agriculture.* Paris, N. 37, 1910.

The Panama Government has been much interested recently in the manufacture of sugar and a plant has just been laid down at Las Tablas with a centrifugal machine recently introduced. The experiments have proved satisfactory; and other machines have been put up in various localities in the province of Los Santos, the district best adapted to the cultivation of the sugar cane.

Panama

The sugar industry promises to acquire much importance in Panama, and the country will probably soon be able to supply the quantity of sugar required for local use.

T. D. Progress of Sugar Production in Cuba. (Havana: Cane Growers' Profits, Loss in Sugar Manufacturing). — *The Louisiana Planter and Sugar Manufacturer*, vol. XLV, N. 15, pp. 232-232, New Orleans, Oct. 8, 1910.

Cuba

The constant progress made in the manufacture of cane sugar in Cuba has enabled several sugar manufacturers to raise the percentage of juice extracted from the canes to 12.5 per cent and even 13 per cent; and at the same time to decrease the fuel that is added to the bagasse. Thus, whilst the manufacturers are making a bigger profit, the planters are also getting a better price for their cane, independently of the condition of the market.

The loss in manufacture is reduced, in the best sugar factories, to only 1.85 per cent of the cane:

Sugar remaining in the bagasse . . .	1.10 %
» » » molasses . . .	0.45 %
» » » scum . . .	0.05 %
» » unaccounted for . . .	0.25 %
<hr/>	
Total percentage of loss of sugar relatively to weight of cane . . .	<u>1.85 %</u>

SPERBER. Sugar Industry in Peru. — *The Louisiana Planter and Sugar Manufacturer*. New Orleans, Oct. 1, No 14, 1910, p. 213.

Peru

Peru is very suitable for growing sugar cane, and is likely soon to rank first amongst sugar producing countries. This is due to the favourable climate and labour conditions in the coast regions, the part of Peru best adapted for raising sugar. The climate is very hot, and rains and frost are unknown. The want of rain which would be a drawback elsewhere, is here considered a great benefit, as the crops are never exposed to heavy, injurious downpours.

Artificial irrigation from the numerous water-courses supplies the necessary moisture; and the growth of the crops is so regulated that the ploughing, planting, harvesting and milling of the cane continue all the year round. Thus, capital invested in sugar production in the coast-land of Peru is never unproductive.

There is no need of sending Peruvian sugar abroad for sale, as the entire output is bought up in the country, even when its price is higher than that of other sugars. Peruvian sugar is much sought after in the United States, on account of its quality.

The thing wanting for Peru, to become the chief sugar producing country in South America, is capital and enterprise, which would enable the country

to avail itself of the advantages that the opening of the Panama Canal will offer. This event will give considerable impetus to Peruvian economic development.

S. G. RUEGG. **Extracting Sugar from Dried Cane, in Wisconsin.** — *The Louisiana Planter*, New Orleans, Nov. 5, 1910.

The United States Sugar Company at Madison (Wisconsin) is making experiments in extracting sugar from dried or crushed cane, sent from the Nipe Bay factory in Cuba, where the contracting engineers, Roberts Brothers, of Chicago, have set up special machinery for the purpose. The first experiments were made with 50 tons, and the results were fairly satisfactory; but the process of extraction will have to be turned into one of washing with a special battery, for, as the drying breaks up the cells, the sugar is not extracted by osmosis and dialysis, as with beets. The washing may be done with cold water and quickly, but special modifications must be made in the diffusion apparatus, because the very fine pith becomes so tightly packed that the water cannot circulate through it.

Experiments with dried beets by the Simmons Sugar Company of Kenosha did not give satisfactory results.

United
States:
Wisconsin

Development of the Milling Industry in China. — *Le Meun. franc.* Paris, Oct. 1910, 236,

The milling industry is rapidly developing in China, and the mills around Shanghai are becoming more important every day; they have succeeded in conquering the markets throughout the district between Shanghai and Hong Kong in the South.

China

This development of the milling industry in North China is all the more astonishing as the climate is far from being favourable, and also because the natives are very unpractical in their methods of cultivating wheat. Their methods of harvesting and threshing are not such as to improve the quality of the wheat, which has to dry in the sun for a long time after the harvest is over.

N. CHRYSOCHOÏDES. **Handbook for Millers, Corn-Dealers and Mill-Builders.** — *Encyclopédie Roret*, T. I, pp. VIII-429; T. II, p. 324, fgs. 140. Paris, 1910.

With the rise of the wages of the working classes tastes become more refined and people more and more exacting in regard to their food. This has caused a radical change in the miller's trade. The old simple mill with its rudimentary mechanism, is disappearing, and in its place large mills have

France

risen, near the great centres where wheat is accumulated: mills equipped with good machinery and with facilities for transport and distribution.

This Handbook describes the process through which after its arrival at the mill the wheat is transformed into marketable products, such as flour, groats and bran.

The Handbook is divided into the following chapters: 1) Cleaning the wheat; 2) Grinding; 3) Separation and division of mill-products into marketable products; 4) The auxiliary plant of a mill; 5) Transport of products; 6) Mill granaries; 7) Milling diagrams; 8) Milling methods; 9) Plan of a mill; 10) Windmills; 11) Cereals; 12) The results of grinding.

M. FRÉDÉRIC-HENRY LORING. **Process for Seasoning, Conditioning and Bleaching Flour.** (French Patent). — *La Meunerie Française*. Paris, October 1910. No 301, p. 233.

France

This flour is acted upon by vapour of sulphuryl chloride or other chloride or oxychloride of sulphur, or of formic acid. The vapours are mixed with a large volume of air or of some other inert gas, the mixture being obtained by letting the air bubble through (or pass over the surface) of the sulphuryl chloride, or other active agent. After treatment, the flour is aerated. The treatment by chloride or oxychloride of sulphur may be applied either simultaneously, or before or after the action of other agents used for improving flour, such as nitrogen peroxide.

I. I. VAN DE VELDE. **Sterilising Flour in Connection with Panary Fermentation.** — Académie Royale de Belgique. *Bulletin de la classe des Sciences*, Brussels, 1910, No 7, pp. 597-610.

Belgium

To determine the relative importance of the various organisms observed during panary fermentation, investigations were made to ascertain whether flour could be sterilised without altering the properties of its gluten. As it was found impracticable to sterilise by heating, an acetone solution of chloroform as well as successive treatments by formol, were used.

The formol was insufficient as a germicide, or rendered the flour unfit to be a medium of culture. The mixture of chloroform and acetone destroyed all the organisms in the flour, except *Bacillus mesentericus vulgatus*.

Linseed and Soya Oils. — *The Chemist and Druggist*. No 1601, vol. LXXVII, Oct. 1, 1910. London, p. 63.

Great Britain

The great scarcity of linseed oil is causing anxiety. The paint-trade is using more or less satisfactory substitutes, but nothing can replace pure linseed oil in certain industries. The scarcity of linseed oil is explained

partly by the shortage of the seed-supply and partly by the fact that many crushing-mills are occupied with the soya-bean. The present price of linseed oil is about 100 per cent higher than a year ago: indeed, during the last twenty years the price of linseed oil has never been so high.

YVES HENRY and PAUL AMMAN. **The Adam Knox Crushing Mill for Extracting Elaeis Palm Oil.** — *Agriculture pratique des pays chauds*. Paris, August, 1910, No 89, pp. 135-142, and Sept. 1910, No 90, pp. 226-231.

Experiments have been made at Aburi (Gold Coast) to ascertain what modifications must be made in the various types of mills in order that they may be used by natives for crushing the Elaeis nuts and also for working the entire fruit.

Gold Coast

The writers have studied the effect of speed in crushing, and the importance of selection, of drying and of selection after drying, and they conclude as follows:

1) It is very important, with the dry nut, to regulate the speed of the drum so that the kernels are not crushed too rapidly;

2) Great saving in speed may be effected by judicious drying.

The palm nuts used were of two varieties, common on the Gold Coast:

a) the *Abe pa*, fruit red, black at tip: 130 nuts to the litre;

b) the *Abe dam*, fruit entirely red: 170 nuts to the litre (1).

Diet Investigations by the U. S. Office of Experiment Stations. Organization and Publications. — *U. S. Department of Agriculture, Office of Experiment Stations. Circular 102*, Sept. 15, 1910, p. 1.

The object of these investigations is the study of the food value for man of agricultural, animal and vegetable products. Numerous reports have been published in technical bulletins, and the most important results and general data summarised in the *Farmers' Bulletins*, in circulars and in other similar publications. The list of these publications is given in Circular 102.

United States

(1) The species used for the extraction of oil is the *Elaeis guineensis* Jacq. This palm tree grows wild in Cazamance, Rio-Nunez, Rio-Pungo, Grand-Bassam, Assinie, Dabou, Gabon, where it is very abundant, and all along the coast of Guinea.

The fruit of this plant is gathered when ripe, and is left for some time heaped on the ground, undergoing a sort of fermentation. When sufficiently fermented, the fruit is boiled in water for a certain time, then pounded in wooden mortars; the kernel removed, and the fibrous sarcocarp boiled again. The oil, which it contains in the proportion of 65 to 70 per cent, rises to the surface of the water and is skimmed off with wooden ladles. The crushed kernel contains 45 per cent of fat, which is white, firm and fresh, and might perhaps be used as butter.

The part of West Africa known as the *Palm Coast* carries on the biggest trade in oil. See T. I. ALDRIDGE, *Sierra Leone*, London, 1910, p. 334. [Ed.].

Tin Salts in Canned Foods. — *The Canner and Dried Fruit Packer*. Vol. XXXI, No 14. Chicago, Oct. 13, 1910, p. 17.

United
States

The U. S. Department of Agriculture has issued a *Food Inspection Decision* No 126, which rules that all canned goods prepared prior to January 1st, 1911, will be permitted to enter and pass into interstate commerce without detention or restriction in so far as their content of tin salts is concerned.

But all foods canned subsequently to January 1st, 1911, will be refused importation and interstate commerce if they contain more than 300 milligrams of tin per kilogram, or salts of tin equivalent thereto. If such goods be found in interstate commerce, proper action will be taken.

It is the opinion of the Board that the trade will experience little hardship in adjusting itself to this condition, as the results of examinations made by the Bureau of Chemistry of various types of canned goods indicate that in the great majority of cases the quantity of salts of tin lies well within the assigned limit.

Organisation of the Sale of Perishable Foods in Canada. — *Bulletin de l'Office du Gouvernement de l'Algérie*, Paris, October 1, 1910.

Great
Britain
and
Ireland.
Canada

There is an Official Service in the United Kingdom for the inspection of perishable foods from Canada. Its function is to examine the packing of butter, cheese, eggs, fruit and other commodities. The Service is not of the nature of a sanitary inspection, but has only to make sure that the goods are delivered in sound condition to the British consumer.

In addition to this control in England, all alimentary and other commodities exported from Canada are examined before leaving Canada, under the Inspection and Sale Act.

Paris Museum for the Improvement of Packing of Farm Produce — *Deutsche Landw. Presse*, Sept. 24, 1910.

France

The *Société pour l'amélioration des emballages des produits agricoles* (Society for improving the packing of farm products) instituted by E. Tisserand, has opened a permanent museum in the Carmes Market, Boulevard Saint Germain, in Paris. Entrance to the museum is free, the object being to collect the best models of packing and of packing material for farm produce in use in France and abroad.

The Secretary General of this Museum is M. Camille Pabst, 21 Avenue des Champs Elysées, Paris.

Packing Fruit in Italy for Exportation to Germany. (Appunti sull'imballaggio di frutta destinate in Germania). — *Bollettino del Ministero di Agricoltura, Industria e Commercio*, Rome, 1910, Fasc. 3, Serie B.

Peaches exported to Germany should be packed in small baskets, each peach being wrapped in paper; whole car-loads of these baskets should never be sent. Favourite pears on the German market are the yellow ones, but they must not be quite ripe when sent off. There is no need to pack these pears separately in paper; it is sufficient to place them in layers covered with paper, and there is no reason why whole carloads should not be sent at a time. Apricots must be packed in the same way as peaches. The *Reine Claudes* are preferred to all other plums, and they travel well. Plums fetch a good price in Germany, though the sale is not extensive.

Italy

CH. TELLIER. **The Story of a Modern Invention: The "Frigorifique."** — Paris, Ch. Delagrave, 1910, 1^{er} vol. pp. XI-456.

Dr. d'Arsonval, of the French Institute, says: "In the domain of pure science it is to Tellier that we owe the first idea of the multiple cycle frigorific apparatus, which led to the liquefaction of permanent gases. In practice, it is also to Tellier that we owe nearly all the methods and apparatus which have built up the present cold storage industry. The immense development in the preservation and transport of the most varied foods is due to Tellier's *Frigorifique* ».

France

M. Tellier describes the theory of his invention in all its details, from the obstacles overcome in the scientific investigations down to the innumerable practical difficulties which were mastered with great persistence and faith.

We follow the gradual development of this invention, the triumphal entering of pure science into the practical domain: from the initial experiments to the liquefaction of gases, from the studies on the action of cold on microorganisms, on vegetables, on foods, to the construction of the first "frigorifique" for the exportation of meat from South America to Europe. When it is remembered that goods now kept in cold storage exceed in value six thousand million francs, it may well be observed, as M. Tellier puts it, that the "frigorifique" has amply accomplished its mission.

The last chapters of this publication treat of new applications of frigorific science, concluding with a chapter on the *International Cold Storage Association*.

The Cold Storage Experimental Station at Châteaurenard, Bouches-du-Rhône. France. — *Rev. Scient.* Paris, Oct. 29, 1910, 2^o sem., No 18, p. 561.

The *French Cold Storage Association* has instituted an Experimental Station for the study of the preservation and transport by cold storage of

France

perishable produce, especially fruits and early vegetables. All the early vegetables for Germany and Central Europe, from the Comtat Venaissin and Provence are sent *viâ* Châteaurenard.

The Station is built on M. de Loverdo's plans with subsidies from the Railway Company of Bouches-du-Rhône, from the Dyle and Bacalan Company and from two civil engineers, Messrs. Saint-Père and Ripert. A special laboratory serves for experiments on the application of cold in wine-making. A system of cork panels and charcoal serves in this Station for ensuring isolation. The cold storage apparatus is a carbon dioxide machine of 50 000 "frigories-heures", with a temperature of $+25^{\circ}\text{C}$ at the condenser and -5°C at the refrigerator. The air is sterilised by means of ozone, generated in an ozoniser.

The Station has cost 75 000 francs.

Agricultural Engineering and Farm Machinery and Implements.

Demand for Agricultural Machinery in Russia. — *Journal of the Board of Agriculture*. London, Sept. 1910. Vol. XVII, No. 6, p. 500.

Russia The *Board of Trade Journal* (August 4th, 1910) contains extracts from Consular Reports, dealing with Agricultural Machinery. Particulars of the amount of machinery imported into Russia from various countries, and statistics of the home production are given. Machine-making works are stated to be 340, and the output in 1908 was valued at £3 500 000. Agricultural machinery business increased, both as regards imports and home manufactures, during 1909.

The *Board of Trade Journal* for August 11th gives information on the prevailing terms of payment, pointing out that German makers have a great advantage over British firms in the agricultural machinery market on account of the ease with which the former can obtain credit, German banks offering great facilities in discounting bills. This enables the German dealer to offer more acceptable terms, getting for his machines a better price than his British rival.

For success in this kind of business the maker must keep in touch with his customers, far more than is usual with the British machine-maker.

Probable Demand for Agricultural Machinery in Asia Minor. — *Journal of the Royal Society of Arts*. London, Oct. 21, 1910, p. 1031.

The Turkish Government has appointed a Director of Agriculture for Bagdad. Sooner or later there will be a demand for agricultural machinery of all descriptions. Ploughs and agricultural machinery should be of light make, as the soil is not heavy, consisting chiefly of loam, and the draught animals are small. The only available fuels are kerosene, wood and brush-wood. No coal or electric power is procurable. These facts should be borne in mind in designing engines for driving machines.

Asia Minor

A French firm has already supplied its agent at Bagdad with two sample ploughs. German firms established in Anatolia and Syria are said to hire ploughs and machinery to landowners and farmers, or sell them on payment by instalment.

Agricultural and Industrial Machinery in British India. — *The Board of Trade Journal*. London, Oct. 6, 1910, No. 723, p. 2.

There has been a decline in the values of agricultural implements imported into British India: from 13.27 lacs of rupees (£88 500), in 1907-8, to 9.17 lacs (£61 100) in 1909-10.

British
India:
Punjab

In the Canal Colonies of the Punjab there is a steadily increasing and not inconsiderable demand for labour-saving appliances for farming. Increase, in the imports of machinery of all kinds, of agricultural and industrial machinery in particular, may be expected as a result of the Allahabad Exhibition.

Agricultural Implements and Machinery in the Central Provinces of India. — *The Board of Trade Journal*, London, Sept. 29th, 1910, No. 722, p. 614.

The Deputy Director for Agriculture, Northern Circle, Central Provinces India, states that there is likely to be a great demand for improved machinery and implements in the Jubbulpur and Nerbudda administrative divisions, and that British firms with enterprise could readily dispose of such goods, if designed to suit local conditions.

British
India:
Central
Prov.

Agricultural Machine Trade in China.—*Board of Trade Journal*. Vol. LXX, No. 720. London, Sept. 15, 1910, p. 539.

Notwithstanding the great possibilities existing in China, especially in the great northern plains, there is at present no opening for the introduction of agricultural machinery.

China The financial risk attending the purchase of such machinery for China has been proved in several instances, and British firms in China have to be careful how they make similar experiments. British manufacturers desirous of introducing agricultural machinery into China would have to be prepared to share the risk with their agents to a much greater extent than they show any signs of doing at present.

The chief reasons determining this state of things are the following:

- 1) The subdivision of farms amongst small peasant proprietors;
- 2) Their extremely conservative methods;
- 3) The cheapness of labour;
- 4) The absence of effective organisation of agriculture.

F. BRUTSCHKE. Ploughing by Electricity, Technical Requirements and Yield.—*Zeitschr. Landw. Maschinen und Gerätschaften*. October 22, 1910.

**Germany:
Prussia**

In regard to electrical ploughing in the East of Prussia, it is observed that the best results are obtained when ploughing not more than 0.5 or 0.7 hectares per hour, according to the soil and the depth. The difficulties of transport and the expense of running machines that plough a hectare and more per hour have shown them to be unsatisfactory.

A Turf-Cutting Plough.—*The Gardeners' Chronicle*, vol. XLVIII, No. 1243, p. 307. London, October 22, 1910.

**Great
Britain**

A plough for cutting field and lawn turf, invented by H. J. Müntz, has recently been put on the market by Messrs. Boulton and Paul, Ltd., of Norwich, who state that the great advantage of their machine over others is that it cuts the sods of uniform thickness, effecting a great saving of labour in re-turfing lawns. An acre of turf may be cut in two hours by this plough. This turf-cutter should prove most useful in laying down large lawns.

Importation in Ceylon of Light Iron Ploughs.—*The Board of Trade Journal*. London, September 21, 1910, No. 721.

Ceylon

About 100 new ploughs were used at Tissa (Ceylon) for last winter's cultivation, and some 1600 acres were ploughed. The more intelligent cul-

tivators were not slow to acknowledge the utility of the plough; but there was a certain amount of opposition to its introduction, which however would probably disappear if the fields on which the plough was used yielded a good return. From what the Assistant Agent could gather at the time the crop was being reaped, the crop on ploughed fields was in most cases far better than formerly, when "Mudding" was the system of cultivation employed.

New Disc Harrow. (Neue Scheiben oder Spatenegge. — *Blätter für Zuckerriibenbau*, Berlin, October 1910. No. 19, p. 319.

The firm J. Kenna of Breslau has just turned out a new type of harrow for peat soils, by order of the Prussian Ministry of Agriculture.

Germany:
Prussia

The essential parts of these harrows are smooth or toothed discs, which by their peculiar construction may be adapted to different kinds of soil. The harrow is fitted to a fourwheeled frame, drawn by a steam or electric traction engine.

Drill Machines for the Demtschinsky Cultivation of Cereals. — *Zeit. Landw. Masch. u. Ger.*, October 22, 1910.

Messrs. Siedersleben & Co. of Bernburg, have made some drilling machines for the Demtschinsky system, according to which young cereal plants are earthed up some weeks after sowing and again at the beginning of spring, in order to stimulate growth and development. These drills are now being used for the first time on a large scale, the cereals being sown in rows at the bottom of small open furrows, in which the young plants remain sheltered from the severity of winter. At the beginning of spring, or even towards the end of autumn, the ground is rolled and harrowed, so as to cover the young plants completely.

Germany

W. GERT BOONZAIR'S. Agricultural Machines for the Colonies. — *Journal of the Royal Society of Arts*. London, No. 3020, October 7, 1910, p. 992.

One of Mr. W. Gert Boonzaier's successful inventions is an appliance for doubling, trebling, and even quadrupling the supply of water drawn up by wind power. In countries like South Africa and Australia, where the supply of water is often variable, this should prove a welcome boon. The appliance with the Boonzaier Patent Duplex Lever Multiplier is constructed entirely of wrought iron, it is powerfully built and so simply designed as to be practically unbreakable.

South
African
Union:
Cape
Colony

Two other inventions of great promise will shortly be placed on the market. The first consists of a self-cleaning harrow, which, whenever it be-

comes clogged, can be cleansed automatically by a lever. The second is a double-furrow reversible plough, which is convertible into a treble-furrow on occasion.

Mr. Boonzaier has also invented a sheep-dip heating apparatus, constructed on the geyser principle. This consists of a square iron box the flat bottom of which is evenly exposed to the fire. The hot water flows into the dipping troughs near the bottom at one end, and out near the top at the other, thus maintaining a constant temperature.

Apparatus for filling Beer Casks. — *La Bière et les boissons fermentées*, Paris, Sept. 1910, p. 106.

Germany

Mr. Loew of Dusseldorf has constructed a very simple apparatus by means of which beer casks of all sizes can be filled without loss of either beer or carbon dioxide and consequently without production of froth.

The machine is very easy to work, being set in action by the easy motion of a handle. The maximum delivery is 125 hectolitres of beer per hour, but the machine can be regulated to do less. Three casks, even of different sizes, can be filled simultaneously, by three taps.

E. DELIGNY. **A Mechanical Kneading Trough.** — *Journal d'Agriculture pratique*. Paris, No. 40, Oct. 6th 1910, pp. 440-443.

France

Messrs. Pollet & Co., have constructed a mechanical kneading trough, the "Map", which kneads bread rapidly, economically and cleanly. It consists of a tub turning freely on its axis, and of a framework to which a kneader is attached, worked by a shaft and set in motion by an engine, or by a crank worked by hand. The movement of the tub is ensured by the adherence of the dough, which is dragged and drawn out by the kneader. 200 kgs. of dough can be thus kneaded in 15 to 20 minutes. The cost of the trough is trifling; the kneader can also be worked by a horse. When worked by hand (small model), less effort is required than for hand-kneading.

L. DUBOIS. **Dalén's Milking Machine.** — *Journal d'Agriculture pratique*. Paris, No. 41, October 13, 1910, p. 475.

Sweden

M. Dalén, a Swedish engineer, has invented a new apparatus for milking cows, which was on view at the Brussels Exhibition. There are two rubber surfaces, one fixed, the other moveable. The latter is acted on by two pistons in succession, worked by compressed air. The apparatus is said to be successful.

PLANT DISEASES

NOXIOUS INSECTS AND OTHER PESTS.



INTELLIGENCE

Non Parasitic Diseases of Plants and their Control.

J. COFFIGNIEZ. **Chlorosis: Use of Ferrous Sulphate against Chlorosis in Fruit Trees.** — *Revue Horticole*, No. 21. Paris, Oct. 1st, pp. 496-497.

An account of numerous experiments on the employment of sulphate of iron against chlorosis in fruit trees. The sulphate, introduced into holes made in the trunk or branches, spreads through the upper and lower parts of the tree and does not interfere with the circulation of the sap. The results are good, the trees turning green again and bearing fine fruit.

France

Parasitic Diseases of Plants.

Generalities. — Parasitism. — Bacteria and Fungi as Parasites and Saprophytes.—Remedies.

Parasitism in Plants. — *Nature*, No. 2138, Vol. 84, Oct. 20th, 1910, p. 505. London.

The Carnegie Institute in Washington publishes a volume (No. 129) containing an account of field observations made at the Desert Laboratory of Tucson (Arizona). Dr. W. A. Cannon has discovered parasitism, apparently facultative, in two species of *Krameria*, a genus considered hitherto as auto-trophic. *Krameria canescens* has been found on several hosts, most frequently on *Covillea tridentata*.

United
States

Dr. D. T. Macdougall tried to induce dependent nutrition by the insertion of prepared slips into a host plant. He introduced cuttings of *Cissus*, *Agave*, and other plants into the tissues of the *Opuntia*, the *Echinocactus* and other fleshy plants. In some cases the *xenoparasites* grew roots and showed some degree of development for a year or longer. A stronger osmotic activity on the part of the parasite seems to be essential.

The volume ends with a study on the origin of parasitism.

H. E. ANNETT. **Copper Sulphate on the Leaves of the Tea Plant after Spraying.** — *Journal of Agric. Science*, London, September 1910.

Ceylon

The Bordeaux mixture has given good results in preventing the development of a fungus, *Exobasidium vexans*, causing great havoc in tea plantations in Ceylon. In consequence of the objections raised, chiefly in the United States, to the sale of grapes that had been sprayed with copper sulphate, some experiments in spraying with Bordeaux mixture have been made in Ceylon on tea plantations, completing them by the chemical analysis of the tea gathered, in order to determine the quantity of copper contained in the leaf.

The tea not treated with Bordeaux mixture contained grams 0.005 of copper per pound (1 pound = 453 gr.). The tea which had been treated contained gr. 0.030 per pound. When it is considered that barley contains grams 0.00118 of copper per kilogram, wheat gr. 0.0052 to gr. 0.0108 per kilogram, and that traces of copper are found in all food, it must be admitted that by drinking the tea from plantations treated with Bordeaux mixture only inappreciable traces of copper are introduced into the system

Parasitic Diseases of various Plants and Means of Prevention and Cure.

E. FOEX and D. VIDAL. **Rust resisting Wheats for the South of France.** — *Progrès Agricole et Viticole*, Montpellier. No. 41. October 9, 1910, pp. 447-457.

France

For the last three years some wheat varieties in the South of France have been studied from the point of view of resistance to rust and to "scorching" (*échaudage*). Although the experiments were not sufficiently conclu-

sive, the following list of the more resistant varieties, among which a selection may be made for sowing in the South of France, has been drawn up.

Rieti, Touzelle rouge de Provence, Odessa sans barbes, Médah, Richelle blanche de Naples, Bordeaux, De Gironde, Rouge prolifique, Hybride hâtif inversable.

These wheats may be cultivated separately, or in mixtures of two or three.

V. J. LAMONT. **Rust Resistance and Yield of Various Varieties of Wheat and Oats.** — *The Agricultural Journal of the Cape of Good Hope.* Vol. XXXVII, No. 3, pp. 242-248, Cape Town, September 1910.

The great damage by rust to cereal crops in Cape Colony renders necessary a careful selection of resistant varieties. For many years hundreds of varieties of wheat have been submitted to rigorous tests; but the results were not very satisfactory.

The only truly resistant type is the *Old Rieti*, introduced into Cape Colony for the first time fifteen years ago; but this wheat has the defect of ripening late and easily shedding its grains.

At present the aim is chiefly to create a type resisting rust, all other qualities being of secondary importance. Amongst the varieties experimented with, the *Theunissen*, *Syring No. 1*, and the *Glugas Early* wheats take a good place from the point of view of resistance. The *Glugas*, imported from Australia only a few years ago, offers the advantage of having very adherent husks and of maturing early.

Amongst oats the best results were obtained with the *Texas*, *Applez*, *Algerian* and *River Plate* varieties.

South
African
Union:
Cape
Colony

W. J. MORSE. **Blackleg: A Bacterial Disease of the Haulms and Tubers of the Irish Potato.** — *Thirty-Fifth Annual Report of the Maine Agric. Exp. St.*, pp. 309-328, State of Maine, 1910.

A disease, known under the name of "*Blackleg*," is extensively attacking the Irish potatoes in the State of Maine, demanding strong preventive measures. At the level of the soil the stem turns of a blackish colour, which may spread to a height of several inches above ground and is accompanied by necrosis of the tissues. The branches of the plant have a tendency to lengthen, growing along and against the stalk, the leaves drooping and folding. The original tubers invariably rot, and the young tubers run the same risk. Except in low-lying and damp lands, no serious damage is to be feared in Maine. In Canada, on the contrary, great losses were caused by a similar disease, produced by the *Bacillus solanitaprum*, Harrison, which is very different from the *B. phytophthorus*, the cause, according to

United
States:
Maine

Appel, of the *Schwarzbeinigkeit*, or Black-leg disease, in the potatoes of Germany.

As a remedy, it is suggested that rotting tubers be eliminated and those which are to be used for planting be first disinfected with a solution of formaldehyde or of corrosive sublimate.

A. S. HORNE. The Symptoms of the "Internal Disease" and of the "Streak Disease" in Potatoes. — *Journal of Agric. Science*. London, September, 1910.

The tubers of potatoes infected by *Internal Disease* have brown-coloured specks inside. The number of specks, as well as their dimensions, vary according to the intensity of the infection; at the beginning of the infection they are scarcely visible. The presence of this disease was observed in early July, in Devonshire in England. On examining the tubers it could be seen that the skin was in certain cases discoloured, the discoloration being due to the crowding of the internal specks. Even in the first period of the disease the specks had spread through the whole inside of the tuber. The infected cells preserve their starch contents and are disposed in irregular groups. The protoplasm assumes a granulous aspect and a brownish colour, due to the formation of gummy substances. Later on, a change occurs at the expense of the surrounding amylaceous cells, spreading on the discoloured zone and through the dead cells in such a way that a zone of starchless cells is formed near the epidermis. The outer limits and the inner layer of the infected zone react strongly to phloroglucine, while the brown substance contained in the cells scarcely gives a slight coloration with this reagent.

The transformation of the internal layer of cells proceeds gradually as the cells die, as may be perceived by the phloroglucine reaction. The external cellular wall does not readily decompose at the beginning of the disease; even if the disease is propagated from cell to cell this decomposition does not occur until the death of the cell.

Mr. Horne recently drew attention to the presence of certain corpuscles in the cells of potatoes affected with Internal Disease and Sprain. These corpuscles multiply by successive division, sometimes resembling the sporangia of *Chrysophlyctis endobiotica*. The smallest of these corpuscles are sometimes less than $1\ \mu$ in diameter. Mr. Horne believes that whatever the nature of these corpuscles may be, they may be considered rather the result than the cause of the disease.

Frank's opinion, that the specks do not appear at the outer part of the tuber (which is the case with the *Phytophthora*) is not confirmed. The specks often appear near the epidermis, even immediately under it. Affected cells, to the number of two or three, have been met with in some

young tubers in the zone of the internal cambium. It is difficult to establish the point of penetration in tubers which are infected both by *Phytophthora* and by Bacteria; but once the parasite has entered, it develops preferably in the internal tissues.

Symptoms of Streak Disease, or Sprain.

This disease is characterised by bodies in the form of a circular arc or curve, as they appear in the section, often taking the aspect of a series of curves one within the other. These spots or semi-lunary bands sometimes form compact masses. Isolated cells are occasionally observed, and also groups of cells similar to those described by Frank in the disease called *Buntwerden*; but it is difficult to establish whether these cells or these zones are connected with the others. In the early phases of the disease and in the slighter infections, the characters described above may be reduced to simple lines or even corpuscles. From the examination of several samples of infected tubers of well known varieties, the writer has come to the conclusion that although there are intermediate stages between the appearance of these corpuscles and the formation of the characteristic undulated spots seen in section, the form taken in passing from the corpuscle to the characteristic speck of the *Internal Disease* is never observed. The manner of propagation of the disease and the way in which it develops are as yet unknown; indeed, it has been remarked that the curvilinear bands do not develop along vascular bundles nor in special series of cells. Neither is it possible to explain why the disease appears sometimes in the form of semi-lunary bands and sometimes in that of spots. The cells which form these bands are united one to the other, but the way they are disposed is not regular. It has not been possible to observe any difference in the structure of the walls which separate the infected cells, forming the characteristic bands; these infected cells have a great resemblance to those suffering with the *Internal Disease*.

At the beginning of the infection alterations in the walls are sometimes perceived, generally due to fragments of the impaired protoplasmic membrane of the neighbouring cell. The median lamella of the cell-wall of infected cells gives little or no reaction with phloroglucine. When the infection shows itself near the epidermis the cells which are just under it assume a flattened form, probably due to the action of the infected zone of the cambium. In this case, the median lamella of the cell-wall gives a more marked reaction with phloroglucine and the gummy substance reacts slightly.

In tubers strongly attacked by *Streak Disease*, the bands in the form of circular arcs extend near to the exterior, nearly reaching the cork layer of the skin. Less frequently the bands may be traced to the lenticels or to excoriations. The connection with the external pellicule is shown by a line of undulated cells which may be seen by making a series of sections.

Experiments have been made to control Frank's assertion that tubers affected by the *Buntwerden* disease, when used as seed, produce sound tubers. In some of the experiments 22 per cent of the tubers were diseased, and in all the other experiments made with tubers affected with the *Internal Disease* and the *Streak Disease*, both in Devonshire and in Northumberland, a crop was obtained which had a high percentage of infected potatoes.

In some experiments on the conservation of tubers, it was observed that the infection is propagated from the diseased to the sound potatoes. To these diseases are often added, the *Phytophthora infestans* in the fields, and the *Fusarium Solani* in the places where the potatoes are stored.

G. ARNAUD. **A New Disease of Alfalfa, or Lucerne. (Red Disease).** — *Progrès agricole et viticole*. Montpellier, No. 43, October 23, 1910.

France

In the neighbourhood of Montpellier, France, a disease of alfalfa, new to the neighbourhood, was observed by M. Arnaud; but the disease has been known for a long time in the United States. The infection is caused by a fungus, the *Neocosmospora vasinfecta* Smith, a Nectriaceae. The fungus attacks the tap-root and radicles of lucerne, and spreads a little into the stalk and leaves, which die rapidly. On the roots appear tiny brick-coloured prominences, formed by ascus-containing peritheca. In addition to the ascospores, the fungus multiplies by spores of the *Fusarium* type. In order to combat this disease, investigation must be made, as has been done in America, to find resistant varieties of alfalfa; the lucerne must be alternated with other crops, and the soil should be disinfected with carbon di-sulphide, or with formol. Soil and climate must have some influence on the development of this disease.

CH. MAUBLANC. **Sugar-cane Diseases.** (Diseases of Plants cultivated in Tropical Countries). — *L'Agr. pr. des Pays chauds*, Paris, Sept. 1910, pp. 232-252.

France

M. Maublanc, continuing the study of the different diseases of the sugar-cane, describes the *Black rot* (*Thielaviopsis*); the *Rind disease* (*Coniothyrium Sacchari*); the *Lasioidiplodia Theobromae*; the *Marasmius Sacchari*; the *Schizophyllum commune*; the *Trametes pusilla*; the *Sphaeronema adiposum*; the *Cytospora Sacchari*; the *Saccharomyces apiculatus*; the Gum-disease, or *Gommose bacillaire* of the sugar cane; the *Point rot* and the *Knot-rot* (*Collet-rot*). The descriptions are accompanied by illustrations and numerous bibliographic data.

F. PETCH. **Diseases in Tea Plant Nurseries.** — *Tropical Agriculturist*, Volume XXV, No .3, Sept. 1910, Colombo, p. 223.

During the last two years nurseries have been laid out for providing tea plants for new plantations, to substitute those believed to have been injured by associating the tea-plant with *Hevea*. There has been a great mortality in the nurseries of certain localities during the last few months; in every case the cause of infection appears to be the same fungus.

Ceylon

The infection appears at the vital knot of the plant, where a ring is formed of decayed bark, extending to within about 25 millimeters from the soil; this infected ring prevents the descent of the sap. A swelling (struma) is thus formed in the upper part of the stem in the infected region, below which development is arrested. The lower extremity of the swelling is marked by a callosity, forming a ring round the stem. The progress of the infection is slow, the upper part having time almost to double its diameter before decaying. The cause of the disease appears to be a kind of *Fusarium* (*Tuberculariaceae*).

Mr. Petch proposes as a remedy to cover the infected soil, as soon as the plants have been attacked, by a layer of coarse sand, carefully pressed down; better still, he proposes to sterilise the nursery-bed before sowing, as is done in the United States for tobacco, by injecting steam, by soil-burning, or by formalin.

In order to sterilise by steam, iron pans are used which measure 2 or 3 metres in diameter and 14 centimeters in depth. These are inverted over the ground, into which their edges are well pressed down, the steam under pressure being then injected in the pans.

A more economical method is that of soil-burning. When the nurseries are attacked by the fungus in question, all the plants affected must be pulled up and burnt, and the ground sprayed with a 7 per 1000 solution of carbolic acid.

F. PETCH. **Stem bleeding Disease of the Cocconut.** — (*Circ. and Agric. Journ. Roy. Bot., Gardens, Ceylon*), pp. 194-305; *Botanisches Centralblatt*, Bd. 114, No. 13, Jena, Sept. 27, 1910, pp. 330-334.

The first part of the article gives general information concerning the structure of the trunk of the cocoa-palm, on the effect of the disease, its influence on the crop and its geographical distribution.

Ceylon

The external symptom of the disease is a flowing of sap through fissures in the bark. The sap is slightly sticky, soon blackening by exposure; the fissures formed in the bark are few, often only one.

Examination of the infected trunks showed the presence of the hyphae of

Thielaviopsis ethacetica; inoculation experiments have proved that this fungus is the cause of the disease.

The fungus produces two kinds of spores; oblong spores with thin walls (*microconidia*) and oval black spores (*macroconidia*). The two kinds of spores are *endoconidia*, that is, they are produced in the interior of the conidiophorum and not externally to this organ. The *Thielaviopsis* develops abundantly in the internal tissues of the trunk of the cocoa-palm, probably on account of the sugar contents of these tissues; the fungus develops feebly, or not at all, on the leaves and the envelope of the fruit, whether fresh or fallen. The disease is undoubtedly propagated by spores, transported from one tree to another.

Experiments have been made to investigate the biological development of this fungus, and to determine the effect of certain chemical reagents on its development. Carbolic acid and sulphate of copper at different concentrations kill the spores, or at least prevent them from germinating. It is advisable to cut away all the affected parts and to smear the wounds immediately with tar, in order to avoid the attacks of the Red Beetle.

The writer gives information on the causes of this disease of the cocoa-palm, and suggests some remedies. It is generally known that this fungus attacks several plants in different countries; and it is believed that it infects the plants through wounds.

Club Root in Cabbage in the State of New York. — *American Agriculturist*. *The Canner and Fruit Packer*. Vol. XXXI, No. 14, Oct. 13, 1910, Chicago.

United
States:
New York

In the course of this year cabbage cultivations in the western part of the State of New York have suffered greatly from Club root (*Plasmodiophora Brassicae*). There is no remedy that is of any use to save the cabbages attacked; but the disease may be prevented. A change in the succession of crops for four or five years is a good preventive, if use is made of manure exempt from the disease. The latter may be extirpated by a strong dressing of lime (2 to 5 tons of lime per acre) immediately after the harvest, no cabbages being planted on the infected soil for from 3 to 5 years (1).

(1) "Finger and toe", also known in different districts as 'Club-root', 'Anbury', 'Grub,' etc., is caused by a Myxogaster called *Plasmodiophora Brassicae* (Woronin). Nearly all kinds of cruciferous plants, both wild and cultivated, are attacked. The cultivated plants that suffer most in Great Britain are turnips and the various kinds of cabbage. The root is the part attacked, which becomes much distorted and more or less covered with large swellings, or finger-like out-growths. Finally the entire root is resolved into a loathsome, rotten, foetid mass. The disease has undoubtedly increased very much in severity in Great Britain during the past fifty years. This period agrees roughly with the cessation

Bacteriosis of Tomatoes and Potatoes.—*The Gardeners' Chronicle*. N. 3642, London, October 15, 1910, p. 283.

This disease has been known for a long time in America, where it has been studied by Dr. E. F. Smith. It has recently found its way into Great Britain, where, according to the *Journal of the Board of Agriculture*, it has become endemic to at least two localities and is giving cause for serious concern. Bacteriosis is caused by the *Bacillus solanacearum*, which is carried by insects on to the stems of plants, whence it penetrates to the inner tissues by means of the holes made by the insects and works its way all along the stem.

Great
Britain

The effect of the disease is to cause the upper leaves to wither and shrivel up, turning yellow; brownish black spots then appear on the leaves and dark brown streaks on the stems; a section of the stem shows the vascular tissues turned brown, which under the microscope are seen to be full of bacteria. The fruit is also spotted brown. All the organs so spotted finally fall off.

The disease manifests itself in the same way in the potato with the addition of a brown circle at a little distance under the skin in infected tubers.

As this micro-organism is propagated by insects, the best remedy seems to be that of preventive sprayings with some insecticide, such, for instance, as arseniate of lead.

WAGNER New Investigations for Combating the American Gooseberry Mildew. (Neuere Versuche zur Bekämpfung des amerikanischen Stachelbeermehltaus). — *Rheinische Monatschrift f. Garten u. Gemüsebau*. Bonn, October 1910, No. 10, pp. 146-148.

At Alster, in the district of Bonn, in Germany, experiments have been made to control the American gooseberry mildew. The bushes were sprayed with solutions of sulphate of lime, with Bordeaux mixture and with carbolineum.

Germany

Not one of these solutions was sufficient to destroy the blight. Dusting with powdered sulphur during the summer hastened the fall of the leaves. Pruning down to the vital knot does not appear advisable, for the young growths which sprout forth after this pruning are very easily invaded by the blight.

The most practical method seems to be that of limiting the pruning, during the winter, to the infected yearling shoots.

of the previous general use of lime in favour of artificial manures, many of which contain crude acid." G. MASSEE, *Diseases of Cultivated Plants and Trees*, London, Daskworth, 1910, p. 524. [Ed].

RAYMOND BRUNET. **An Inquiry into the Treatment of Vine Mildew in 1910.** — *Revue de Viticulture*. Paris, October 20, 1910, No. 879, pp. 421-456.

In consequence of the great damage caused, in 1910, by mildew, in the wine-growing districts of France and Central Europe, the *Revue de Viticulture* has organised an inquiry in the different regions of France to investigate the causes of failure in controlling the parasite.

France

The result of this inquiry is that the efficacy of copper salts in the treatment of mildew, which appeared for a moment doubtful, has been again confirmed.

The damage done by the infection has been great because the Bordeaux mixture dressings were applied too late, at too long intervals, and were not accompanied by treatment with a dry mixture of flowers of sulphur with copper sulphate.

The spraying with the liquid mixture ought to have been followed by treatment with the sulphur-copper powder.

The observations made in the different regions of France suggest the following:

1) Treatment with Bordeaux mixture before the appearance of the mildew in the region;

2) Renewing the treatment each time that the vine is in a state of receptivity: *viz.*, when the barometer is falling and the temperature cooling;

3) To treat rapidly with the Bordeaux mixture, even when it is raining;

4) To dust freely with the sulphur-copper powder all over the vine and on both sides of each row;

5) To raise the vines as soon as possible;

6) At blossoming to treat with Bordeaux mixture and then with sulphur-copper dust; after fertilisation of the flowers to dress only with sulphur-copper dust. Vines in a good state of vegetation are the most resistant to mildew.

J. B. POLE EVANS. **A New Disease of Citrus Fruits.** *Transvaal Dpt. of Agr. Farmer's Bull.*, No. 109, p. 1.

In Natal, a new disease has been discovered in *Citrus* fruits.

South
African
Union:
Natal

The infected fruits, when exposed to the air, blacken and wither rapidly. If sheltered from the air, they soften, turn brown, and the outer surface of the pericarp becomes covered with greenish exudation and with an olive green coloured velvety felt.

These alterations are caused by a fungus, *Diplodia natalensis* (1). The

(1) Sphaerioidaeaceae. *Ed.*

disease spreads by means of spores abundantly produced on the infected fruit, which must consequently be at once gathered and destroyed by burning.

A. DUCLOUX. **Apple Tree Canker.** — *Revue horticole*, Paris, No. 21, 1 November 1910, pp. 506-508.

The apple-tree canker, due to *Nectria ditissima*, causes considerable ravages in the North of France; the woolly mite or aphid (*Puceron lanigère*) greatly contributes to the spreading of the canker.

It appears from an inquiry made by M. Ducloux that the apple-tree canker, aided by the woolly aphid, is causing much harm in Belgium, Holland, in the Rhine Provinces and in North Germany. All the old varieties, with the exception of the *Petit Bon Pommier*, are affected; the new varieties show a greater resistance. The influence of the soil is evident; for the canker shows itself mainly in places that are either too damp or too dry, or where the soil is very rich in nitrogen. The writer gives a list of the French, Belgian, Dutch and Rhenish varieties of the apple which have shown themselves resistant to canker:

1. *French varieties*: Transparente de Croncels; Posson de France; Petit Bon Pommier; Belle-Fleur du Brabant.

2. *Belgian varieties*: Belle-Fleur du Brabant; Gueule de Mouton.

3. *Dutch varieties*: Belle de Boskoop; Double-Brabant; Jacob Dirk.

We may add Reinette Ananas, a great favourite in the Rhine Provinces.

4. *Varieties of the Rhine Provinces*: Roter Eiser; Purpurroter Cousinot; Boiken (1).

CH. E. LEWIS. **A new Cryptogamic Disease of the Apple.** (New Species of *Endomyces* from Decaying Apple). (*Bull. No. 178 of the Maine Agricultural Exp. Stat.*, April 1910); *Botanisches Centralblatt*, Bd. 114, No. 16, Jena, 1910, p. 404.

A new species of fungus which causes a disease of the apple called *Endomyces mali* is described. Its cytological characters are given together with a comparison with the *Endomyces Magnusii*. The article ends with a discussion on the classification of this fungus, and a bibliography. Details of its structure are illustrated by 14 figures.

(1) *Nectria ditissima* (Tul.) attacks not only apple-trees, but also frequently the beech, oak, hazel, ash, hornbeam, maple, lime, dogwood and bird-cherry. G. Massee has observed it on the gooseberry in such quantities as to kill the branches. The fungus is a wound-parasite, and it frequently follows on the wounds caused by the American Blight (*Schizoneura lanosa*) since the advent of which in Great Britain canker has been much more prevalent, "and perhaps it is not going too far to state that if we had no American blight or woolly aphid we should have no epidemic of canker."

See G. MASSEE, *Diseases of Cultivated Plants and Trees*, London, 1910, p. 183. [Ed.].

France.
Belgium.
Holland.
Germany

United
States:
Maine

- CH. E. LEWIS. **Diseases of the Apple Tree caused by "Coryneum Follicolum" Eckl. and the "Phoma Mali" Schulz and Sacc.** — (Bulletin No. 170 of the Maine Agric. Exp. Stat., Nov. 1909); *Botanisches Centralblatt*, Bd. 114, No. 16, Jena, 1909, p. 404.

United
States:
Maine

The two fungi described in this Bulletin cause diseases in the trunk of young, and in the branches of fully grown apple trees. These parasites settle in cracks, crevices and weak spots, and attack the young trees in the same way as the *Iphaeropsis malorum*.

Mr. Lewis gives a detailed description of the characters of these two parasites, and shows in 42 engravings the different phases of their development on the wood of young apple trees, and on mature trees.

- J. B. RORER. **A Bacterial Disease of the Peach.** — (*Mycologia*, I, pp. 23-27, 1909). *Botanisches Centralblatt*, Bd. 114, No. 13, Jena, 27 September, 1910, p. 331.

Great
Britain

A Report on the *Bacterium Pruni*, and on the inoculation of this bacterium. These studies are not yet complete, but results so far obtained convince the writer that the *Bacterium Pruni* is the cause of a disease of the leaves, small branches and fruits of the peach.

- MER. **Damage caused by the Lophodermium Macrosporum.** — *Bull. des sciences de la Société nat. d'agr. de France*. Paris, July, 1910, No. 7, pp. 652-660.

France

The author has studied the injury caused by this fungus on the Spruce in the Upper Vosges. He distinguishes two forms of the disease, which he defines form α and β . The first appears on leaves which possess a remarkable degree of vitality and contain starch. Form β appears on the leaves of branches two or three years old which are decaying. Instructions are given for combating this parasite, which may cause considerable damage.

- F. T. BROOKS. **Rhizina undulata in Pine Trees.** — *Quarterly Journal of Forestry*, October, 1910, p. 308. London.

Great
Britain

Some specimens of young pine trees attacked by the fungus *Rhizina undulata* were recently examined. The damage caused by this fungus is so serious that it has been considered advisable to draw attention to its destructive power in plantations of young Conifers. The fructifications of this fungus should be gathered and destroyed. This could be done by children, greatly diminishing future danger.

ABDUL HAFIZ KHAN. **Root Infection of "Trametes Pini (Brot) Fr.** — *The Indian Forester*, October, 1910, No. 10.

In 1904 a serious disease was reported in the forests of the *Pinus excelsa*, Wall (Blue Pine or *Chil*) in the Division of Simla. The trunks of the pines affected by the disease were found to be infested with the sporophores of a fungus. Mr. Mayes, Deputy Conservator of Forests, sent specimens to the Imperial Mycologist, and the fungus was recognised as being the *Trametes Pini*, Fr., which causes the disease well known in Europe under the name of the "ring scale" of the pine-tree.

British
India

P. MAGNUS. **Oak-White (Oidium).** (Zum Auftreten des Eichenmehltaus). (*Ver-einschrift. Ges. Luxemb. Naturfreunde*, pp. 168-111, 1910). — *Botanisches Centralblatt*, 114, No. 15, Jena, 1910, 11 October, p. 385.

The writer denies that the cryptogamic disease which has attacked European oaks in an epidemic form since 1907, is of the same nature as that observed by Mérat near Paris in 1843. The latter must, as a matter of fact, be attributed to the *Phyllactinia corylea* (Per.) Karst., which differs greatly from the *Oidium* epidemic amongst oaks. Mr. Magnus considers it improbable that Oak-White is of American origin, as no epidemic of Oak-White has been observed in America, and American oaks are seldom attacked by it in Europe, either spontaneously or artificially. Oak-White may belong to the biologic cycle of the *Microsphaera Alni* Wallr.

Luxemburg

PAUL VUILLEMIN. **Oak-White (Oidium) counteracted by a Natural Enemy (Cicinnobolus).** (On a natural check to the Oak-disease). — *C. R. Ac. Sciences*, Paris, 10 October, 1910, p. 647.

Oak-White is caused by an *Oidium*, the origin of which is still uncertain, which has attacked the oaks of Europe and North Africa since 1907. An unusual succession of mild winters and wet summers has favoured the disease and has given rise to a natural enemy of the *Oidium*.

France

The writer observed last September, in the wooded country which separates the Meuse from the Moselle, and in the forest of Nancy, a *Cicinnobolus* (*Sphaeropsidea*) whose characteristics agree with those of the *Cicinnobolus Cesatii* De Bary of the *Evonymi* F. form, which destroys *Oidium*.

The *Cicinnobolus* prevents both the multiplication of *Oidium* by means of conidia and its preservation by mycelium. It possesses pycnids of 40 μ -50 μ . by 26 μ -32 μ . or more, and spores of 6-7 μ . by 2-2.7 μ .; otherwise, it has the usual characteristics of its congeners. The *Cicinnobolus* has been observed on several *Erysiphaceae* and the chief difference between the species is one of dimensions or simply of the organism on which they have been observed.

The spontaneous settling of the *Cicinnobolus* on the Oak *Oidium* puts a natural check on the propagation and persistence of oak-white. Foresters can thus rely on these natural agents to attack *Oidium* and restrict themselves to keeping the trees in healthy conditions.

F. PETCH. Die-Back, a Cryptogamic Disease of the *Hevea brasiliensis*. — (Die-back of *Hevea brasiliensis*). (*Circ. and Agric. Journal Roy. Bot. Gard. Ceylon*, pp. 304-321, 1910). *Botanisches Centralblatt*, Bd. 114, No. 13, Jena, 27 Sept. 1910, p. 330.

Ceylon

The fungus *Gloeosporium alborubrum*, Petch, which causes this disease, attacks the terminal shoot towards the middle. The part attacked turns dark brown, and the discoloration extends above and below. This process appears to be due to the true *Die-back* fungus. Unless the dead bud is nipped off, a secondary fungus, *Botryodiplodia elastica*, attacks the affected part and spreads downwards, through the trunk, killing it little by little to the root.

The fungus appears on the bark, and consists of small black globes filled with spores of the characteristic *Diplodia* type, oval with a transverse partition towards the middle. As the fungus spreads downwards, it kills in succession the different circles of branches which remain sound and leafy until it reaches them. The progress of the disease is very rapid; in most cases the tree perishes from four to six weeks from the death of the highest branches. All parts attacked should be cut off and burned.

Mr. Petch discusses the identity of the fungus *Botryodiplodia elastica* with other *Diplodia* which attack plants in other parts of the world.

Dry Rot in Timber. — *The Indian Forester*, Vol. XXXVI, No. 10, p. 629, Allahabad, Oct. 1910.

British
India

It has long been known that the fungus *Merulius lacrymans*, Fries, determines the disease commonly called *dry rot* in timber. In spite of improvements in ventilation systems, etc., the disease appears to be continually gaining ground, which is explained by the rapidity with which modern houses are built, leading to the employment of freshly cut and imperfectly dried timber.

Phanerogamous Parasites and Weeds. — Their Control.

- A. H. COCKAYNE. **Destruction of Weeds by Cryptogamic Diseases.** — *Jour. N. Zealand, Dept. of Agriculture*, Vol. I, No. 3, 15th August, 1910, pp. 214-215, Wellington.

Attempts have been made recently to control weeds by means of cryptogamic diseases, and Mr. Cockayne, Biologist to the Ministry of Agriculture of New Zealand, communicates a report of his experiments. He has mainly studied the destruction of the cardoon of California, obtaining encouraging results with two cryptogams, the *Puccinia Hieracii* and a *Fusarium*, especially with the latter, which has the advantage of attacking the roots and is innocuous to cultivated plants. It has been used to advantage in several parts of New Zealand.

New Zealand

The experiments are being continued in the district of Taieri.

The most serious disease of the blackberry in America is blight (*Caecoma nitens*), which hitherto has not spread much in New Zealand. The *Phoma Rubi* has killed some plants here and there, but has not spread.

The rose blight (*Phragmidium subcorticum*) has spread very much, but its action is not particularly rapid. There is another disease, however, which is very destructive to the sweet briar, which is now beginning to be studied.

- O. MUNERATI. **The Vitality of the Seeds of Weeds in the Ground.** (La vitalità dei semi delle cattive erbe nel terreno). — *Rivista Agraria Poliana*, anno X, No. 19, Rovigo, 30 Sept. 1910, pp. 291-295.

The writer, continuing experiments undertaken some years back on the vitality of the seeds of weeds in the ground, has placed some of these seeds under conditions favourable to germination, experimenting both in a nursery and in the open field. The weeds employed were: *Avena fatua*, *Vicia segetalis*, *Lathyrus Aphaca*, *Rapistrum rugosum*, *Myagrum perfoliatum*, *Sorghum halepense*, *Cirsium arvense*, etc.

Avena fatua was found to be one of the weeds more easily kept down, on account of the greater rapidity with which its seeds germinate.

- J. FARCY. **Destruction of Dodder by Sodium Nitrate.** — *Journal d'Agriculture pratique*. Paris, No. 42, October 20, 1910, pp. 497-498.

Careful experiments made in alfalfa fields invaded by dodder show:

1) That dodder can be destroyed by strong applications (1000 kg. per hectare) of sodium nitrate. Its fertilising action makes sodium nitrate more

France

advantageous than ferrous sulphate and other caustic salts, which are somewhat dangerous to vegetation.

2) That alfalfa and other leguminous forage plants, subject to dodder, are benefited by the fertilising action of the nitrate, notwithstanding the faculty of absorbing atmospheric nitrogen by their root nodules.

N. S. PILLANS **An Amaranthacea Injurious to Sheep.** (The *Amaranthus* Weed in South Africa). — *The Agricultural Journal* of the Cape of Good Hope, Vol. XXXVII, No. 3, pp. 267-268, Cape Town, September 1910.

The *Amaranthus* weed, *Alternanthera Achyrantha*, which was recently imported from South America into Cape Colony, is spreading in the eastern provinces, and causing injury to agriculture and cattle raising.

Its flowers, furnished with spiky squamæ, get readily caught in the fleece of the sheep, whose skin it irritates, thus paving the way for infectious germs.

As this weed spreads very readily by fragments of the rhizome, the soil should be ploughed deeply in order to extirpate these fragments completely.

South
African
Union:
Cape
Colony

Insects and other noxious Invertebrates: Their Biology and Control.

F. PLATEAU. **Experimental Investigations on Entomophilous Flowers, seldom visited by Insects, and made Attractive by means of Odorous Sweet Liquids.** (Académie Royale de Belgique). — *Bulletin de la Classe des Sciences*. Brussels, 1910, No. 3, pp. 144-146.

According to the writer, insects are attracted to flowers much less by their shape or colour than by their scent. If this view be correct, the coloured organs do not exercise the attraction ascribed to them.

For three summers in succession many experiments were made on twelve kinds of flowers which are usually neglected by insects. M. Plateau introduced the following liquids into the flowers: aniseed cordial, the attractive properties of which are remarkable; syrup of brown sugar with the addition of a little rum; the juice of cherries stewed with sugar; finally, a mixture of syrup of sugar and angelica. Not only were the insects attracted, but they often came in as great numbers as to flowers naturally pollenised.

Belgium

F. W. SAUTH. **The Control of Scale Insects in the British West Indies by means of Fungoid Parasites.** — *West Indian Bulletin*, vol. XI, No. 1, pp. 1-30. Barbados, 1910.

The employment of fungi, the mycelium of which develops in the bodies of insect pests, has already done signal service to agriculture. In the West Indies the *Mytilaspis*, the cochineal which causes so much havoc in the plantations of citrus fruit, has been effectually controlled by means of four kinds of fungoid parasites: *Cephalosporium lecanii*, *Myriangium duriaei*, *Ophionectria coccicola* and *Sphaerostilbe coccophila*.

Barbados

There are two means of rapidly propagating these fungi:

1) spraying with water containing a large quantity of spores in suspension;

2) placing fragments of plants attacked by this fungus in the branches of the tree to be protected against the cochineal.

In very dry regions it is advisable to spray the leaves during the hottest hours of the day. Good results have also been obtained by covering the *Citrus Medica* of the Island of Montserrat with a creeping leguminous plant, the *Mucuna pruriens*, the shade from which favours the development of the mycelia, which it protects against the action of the sun and wind.

A series of investigations made throughout the Islands, seems to show that the disappearance of certain cryptogamic diseases, such as *Capnodium* and *Meliola*, depends on the destruction of the cochineals (*Lecanium viride* and *L. mangiferae*), which is therefore doubly advantageous.

JAMES BIRCH RORER. **Destruction of Froghoppers (Tomaspis) by means of a Fungoid Parasite, the "Oospora Destructor."** ("The Froghopper Fungus"). — *Board of Agriculture of Trinidad*. Trinidad, September 23, 1910.

In the southern regions of the United States and in the Antilles, certain entomophagous fungi have been successfully employed against the aphids which injure the orange plantations.

Trinidad

Some experiments just made at Trinidad give hopes of similar results in the case of a fungoid parasite, the *Oospora destructor*, the enemy of the froghoppers *Tomaspis postica*, which infest the sugar plantations.

The thin, cylindrical spores germinate in a few hours if exposed to damp, and the germinal tubes, penetrating through the abdominal articulations of the insect, ramify there in a thick network; the insect dies within a few days.

Slender hyphae issue out of the mass of mycelium, and segment at their

extremities into a great number of spores, covering the body of the insect with thick olive green dust.

Agar, and fresh slices of sweet potatoes, constitute an excellent substratum for the cultivation of these fungi. A small quantity of spores obtained thus and spread over a hundred canes which were vigorously attacked by the froghoppers killed most of them in less than a week.

Froghoppers are particularly active during the rainy season, which is most favourable for the development of this fungus.

The use of Birds in protecting the Cultivation of Tobacco in Salvador.

(El empleo de las aves en el cultivo del tabaco). — *El Hacendado Mexicano*. Mexico, October 1, 1910.

Salvador

In certain regions of Salvador where tobacco is cultivated, the farmers protect the leaves against insects and worms by an ingenious method. A bird called *Chompipe*, which is very easily tamed, is let loose at certain hours of the day over the tobacco plantations, where it destroys the insects and caterpillars on the leaves with surprising voracity and thoroughness. But for these birds, the crops would sometimes be completely destroyed, or expensive hand-labour would have to be employed.

D. DE LANGE. The Use of Ants against the Cacao-Bug in Java. — *Journal d'Agriculture Tropicale*. 30 Sept. 1910, No III. Paris, p. 284.

Dutch
East
Indies;
Java

The writer, who is the botanist of the cacao-tree plantations at Salatiga, gives the following information on the utilisation of the black ant in the destruction of the cacao-bug. During the two years that he has been attached to the Salatiga Station, he visited many cacao plantations where the *Helopeltis* (Cacao bug) is fought by means of the black ant (*Dolichoderes bituberculatus* Mayr). He has never been able to ascertain that the ants make a direct attack upon the bugs. The two insects live near each other on the same branch and meet apparently without doing one another any harm. The damage which the ants do to the bugs is of quite another nature.

It is known that the black ant lives principally on the pod of the cacao tree, to which it is attracted by the secretions of the white cochineal (*Dactylopius crotonis*, Green). The cacao-bug, on its side, prefers to deposit its eggs on the cacao pods. Thus the presence of the ants hinders the bugs from depositing their eggs on the cacao-pods and interferes with the attacks of the young larvae on the skin of the cacao-pods.

The ants never fight the adult bugs, but decimate the larvae, thus rendering precious service to the cacao planters in Java.

FRED. V. THEOBALD. **Grease Banding of Fruit trees.** — *Journ. Board of Agric.*, Vol. XVII, No. 7, October 1910, p. 542. London.

It has long been customary to surround the trunks of trees with bands of viscous matter to prevent insects from crawling up them, and excellent results have in general been obtained. But as several arboriculturists reported failures, many observations and experiments on this subject have been made during the past six years, and it has been found that such grease bands are useful when properly applied.

The main object of these experiments has been:

1. to ascertain what insects injurious to orchards can be controlled by the bands, and when is the period of their appearance;

2. to decide on what part of the trunk the band may be most advantageously applied;

3. to discover which are the best substances to use for making these bands.

The following conclusions have been arrived at:

1. If the bands are to be really efficacious they should be applied in the month of October and kept in place until the middle of April.

2. A large number of injurious insects are taken by these bands, in addition to the *Cheimatobia brumata*.

3. It has been shown that most viscous substances are injurious if applied on the bark of young trees.

The American preparation, Tanglefoot, is not injurious. Experiments, however, should be continued to settle this point finally.

4. The viscous substances employed may be divided into three groups:

a) white or yellow substances;

b) black substances (German Raupenleime);

c) substances of the bird-lime, or Tanglefoot, type.

The first dry quickly; the second are not sufficiently viscous; the third keep perfectly viscous for from 10 to 15 months.

5. The bands are efficacious for trees, but they are not always a sure defence for shrubs.

6. The bands must be placed at a height of not more than 1.35 m. (54 inches) and not less than 0.20 m. (8 inches).

7. The efficacy of the viscous substance depends largely on the quality of paper of which the bands are made.

Great
Britain

E. E. GREEN. **Poisoned Bait for Fruit Flies.** — *Natal Agricultural Journal*, July 1910, p. 84. *Tropical Agriculturist*, Vol. XXXV, No. 3, p. 222. Colombo, Sept. 1910.

Some recent experiments made in South Africa have demonstrated the efficacy of the Mally poisoned bait against flies of the *Dacus* species, which attack oranges, mangos and other fruits as well as cucumbers, pumpkins, etc.

This poisoned bait is composed of sugar (1.400 kg.), arseniate of lead (112 gr.) and water (22 $\frac{1}{2}$ litres). It is of the same type as the *Dachicida* (*Dacus*-killer) that is employed in Italy against the olive fly, composed of 65 parts of molasses, 31 parts of honey, 2 of glycerine and 2 of arseniate of sodium.

South
African
Union:
Natal

R. AHRENS. **The Use of Permanganate against the Woolly Aphis (1) (*Schizoneura Lanigera*).** (Uebermangansures Kali gegen Blutlaus). — *Geisenheimer Mitteil. über Obst-u. Gartenbau*. Geisenheim, Nov. 1910, No. 11-pp. 182-183.

Germany

A report on the good results obtained by the use of a 1% solution of permanganate of potassium.

Another good mixture is: 250 grams of potassium bi-sulphide; 2 kg. of soft soap; 1 litre of tobacco juice, the whole to be dissolved in 100 litres of water (1).

To destroy these insects kerosene should be poured evenly over the surface of the water in the rice plantation, the plants being then shaken to compel the insects to fall on to the kerosene, which kills them.

(1) The American Blight or Woolly Aphis (*Schizoneura lanigera*) "is one of the most wide-spread plant-lice affecting fruit-trees. Its presence can easily be detected by the quantity of white cottony wool produced by the larvae and females. We often, especially in west-country orchards (England), see this white excretion hanging from the trees in great festoons. The trees suffer severely. Apple-trees are those that suffer most, but pear-trees may also be attacked. These plant-lice cause cankered growths to appear on trunk and boughs; the new wood is their favourite seat of war, where they can easily plunge their beaks into the soft rind. This wound usually ends by splitting, deep cracks and crevices being formed, in which the culprits seek shelter later. Growth is checked; the crop does not mature, and often the trees fail under the attack." FRED. V. THEOBALD, *A Text-book of Agricultural Zoology*, London and Edinburgh, 1899. p. 240. [Ed.].

Insects noxious to special Crops.

H. L. DUTT. **The Rice Hispa.** — *Dept of Agric. Bengal Quarterly Journal*, Vol. IV, No. 1, pp. 32-33. Calcutta, July 1910.

This small insect devastates rice fields, by feeding on the leaves of the plant. The females deposit their eggs at the tip of the leaf, and the larvae on issuing destroy the tissue of the leaf (mesophyll). Out of the cavity formed in the leaf the perfect insect issues, devouring the epidermis, thus completing the destruction of the leaf.

British
India:
Bengal

The following remedies are suggested:

- 1) the destruction of the wild grasses on which the insect usually multiplies and whence the Hispa swarms on to the rice-plants;
- 2) The selection of varieties of rice with tougher leaves (1).

H. L. DUTT. **The Rice Fulgorid.** — *Dept. of Agriculture, Bengal. Quarterly Journal*, Vol. IV, No. 1, p. 33. Calcutta, July, 1910.

These are very small insects of a whitish colour, generally found in great numbers clustering on the lower surface of the leaves and on the outer sheath of the rice. They suck the juice of the leaf by a slender and elongated rostrum which they bury in the tissues. The leaf attacked becomes etiolated and yellow.

British
India:
Bengal.

E. ERNEST GREEN. **"Dactylopius Virgatus" (Mealy Bug) on the Cotton Plants of Ceylon.** — *Tropical Agriculturist*. Vol. XXXV, N. 3. p. 22. Colombo, September 1910.

The upland cotton, grown at the Experimental Station of Maha Huppalama (Ceylon), has been violently attacked by a cochineal, *Dactylopius virgatus*. This insect multiplies with extraordinary rapidity, and appears to kill back all the branches on which it forms its colonies. It is a pest that should be treated as soon as it appears, as it is difficult to destroy it when it has

Ceylon

(1) *Hispinæ*. The life history of these beetles is given in H. MAXWELL LEFROY and F. M. HOWLETT, *Indian Insect Life* (Indian Research Institute, Pusa). Calcutta and Simla, 1909, p. 363.

"The essential features of the *Hispinæ* are that the egg is laid in the tissues of a leaf or plant, the resulting grub mining in the tissues, and producing a "blotch" mine. Moults take place inside the mine and the larva is much flattened, though in some cases provided with legs. Pupation takes place in the leaf. So far as known, all *Hispinæ* have such a life-history and the larva lives concealed in the tissues of plants. One species *Hispa aenescens* By. is a serious major pest, and another *Leptispa pygmaea* By. occasionally rivals it." [Ed.].

begun to propagate. It is spread by the coolies who work in the fields, the young insects clinging to their clothes. Soapy insecticides are the best remedy against these insects.

K. SCHLELEIN. **The Beet-Root Parasites** (Tierische Schädlinge in Rübenfeldern). — *Deutsche Landwirtschaftliche Rundschau*, N. 10, p. 102. Lankwitz, Gr. Lichterfelde, 15 August, 1910.

Germany

It is stated that serious havoc has been made in different parts of Germany in plantations of beet-root for sugar-making and for fodder, by the *Silpha atrata* and the *Cassida nebulosa* (1).

The larvae of these insects attack the leaves of young plants, of which they devour all the parenchyma.

Chickens or ducks should be let loose in the fields attacked, as they eat up the larvae; it is also advisable to spread ashes or recently prepared lime on the edges of the leaves.

E. E. GREEN. **Nettle Grub on Tea in Ceylon.** — *The Tropical Agriculturist*, Vol. XXXV, N. 3, Sept. 1910, p. 222, Colombo.

Ceylon

"Nettle-grub" (*Natada nararia*) (2) is reported in the district of Ratota. The grub first attacks the biggest leaves on the lower part of the plant, and gradually mounts towards the younger leaves.

Arsenical sprays would be efficacious, but as they might be harmful to the consumers of the tea, Mr. Green proposes that experiments be made with *Vermisapon*, an Indian insecticide, and that the leaves and twigs which fall be gathered up and burnt, and the cocoons found on the trees collected and destroyed. Neither lime nor sulphur have any effect on these caterpillars.

E. E. GREEN. **The Tea Plant Shot Hole Borer** (*Xyleborus fornicatus*). (Report of the Entomologist). — Supplem. to the *Tropical Agriculturist*, Vol. XXXV, N. 3, Sept. 1910, Colombo.

Ceylon

The tea plant borer is slowly making headway. It has spread into the valley of Kelani; its presence is also reported in the district of Maturata, and it is probably in other localities where it has not yet been identified.

In order to control this insect, it is proposed to import from England the *Clerus formicarius*, a rapacious beetle of which some batches have already been sent out; but they all died on the journey. The experiments will be repeated next summer.

(1) Coleoptera [Ed.].

(2) «A heteroecious lepidoptera whose caterpillars are covered with hair rendered often strongly irritant owing to the presence of formic acid». *Indian Insect Life*, by H. MAXWELL-LEFROY, Calcutta, 1900. [Ed.].

G. POOK. **Destruction of Tobacco Worms by Cold.** (Die Anwendung von Kälte zur Vernichtung des Tabakwurms). — *II Intern. Kältetkongress in Wien*, p. 12, Okt. 1910; *Chemiker Zeitung*, J. XXXI, No. 126, p. 1127, Cöthen, 22 Okt. 1910.

The experiments made with a view to killing the Tobacco-worm by means of frigorific treatment have been very successful. The process is employed to-day in the whole of Brazil. The tobacco is exposed for about 22 days, in premises which are absolutely dry, to a temperature 3° or 4° below zero C., better still 10° below zero C. The worms and their ova are completely killed at these temperatures.

Brazil

E. ERNEST GRENN. **The Mango-Weevil (*Cryptorhynchus mangiferae*) in Ceylon.** — *The Tropical Agriculturist*, Vol. XXXV, No. 3, pp. 222-223, Colombo, Sept. 1910.

The mango-weevil (*Cryptorhynchus mangiferae*) has spread to an extraordinary extent this year. The natives say that there is one in every mango stone. But the presence of this insect does not seem to make any difference in the size or flavour of the fruit. The larva feeds solely on the kernel of the stone and the perfect insect does not usually emerge, until after the decomposition of the fruit.

Ceylon

ANSTEAD. **A New Enemy of the "Castilloa" in India.** (Another Scale-bug Pest of Castilloa). *Planter's Chronicle*, Vol. V, No. 29, Aug. 6). — *The Tropical Agriculturist*, Vol. XXXV, No. 3, Sept. 1910, p. 222, Colombo.

Lecanium oleae, the cochineal of the olivetree (1), attacks the Castilloa in Southern India. It is also found on the Dapap (*Erythrina lithosperma*) (2) and it appears to be rapidly spreading on the coffee tree. This species has hitherto been rare in Ceylon.

Ceylon

H. O. MARSH. **Some Insects injurious to Truck Crops (Kitchen Garden Produce). The "*Diacrisia virginica*."** (Biological and Economic Notes on the Yellow Bear Caterpillar, *Diacrisia virginica*, Fab.). — U. S. Department of Agriculture, *Bureau of Entomology Bull.*, No. 82, Part V, August 31st, 1910, p. 59.

The *Diacrisia virginica* did a great deal of harm in Upper Arkansas in the summer and autumn of 1909. Never before had this region suffered

**United
States:
Arkansas**

(1) This parasite has been successfully controlled in Europe by a decoction of resin, potash and fish oil. E. BOURSAND, *Maladies des plantes*, Paris, 1910.

(2) The Dapap is a tree of the family of the Leguminosae, often grown in rubber, coffee and other plantations for its shade; its prunings, which are rich in nitrogen, are used for vegetable manure. G. WATT, *Commercial products of India*, London, 1910. [Ed.].

from the ravages of so fatal a pest, which broke out in an absolutely unexpected fashion.

List of the plants attacked. — During the month of September, when the disease attained its maximum, the larvae of this insect were found living at the expense of the following plants: mangolds, sugar-beets, beet-roots, rhubarb, cabbage, cauliflower, turnips, radish, celery, carrot, parsnips, egg plant, potato, pumpkin, melon, cantaloup (musk-melon), sweet potatoes, maize, asparagus, peas, earth-nut, alfalfa, holly-hock, *Ipomaea purpurea*, reed, hyacinth, dahlia, cherry, gooseberry, raspberry, currants, grapes, *Rumex*, *Amaranthus*, *Chenopodium*, *Helianthus*, *Solanum rostratum*, *Verbesina*, *Ambrosia*, *Salsula* *Tragus*, *Bidens cernua*.

Arseniate of lead and Paris green were used against this pest on mangolds and on celery. The former proved quite useless; but strong solutions of Paris green, applied carefully by hand to celery, gave excellent results; but when sprayed on mangolds were ineffective. Mr Marsh believes that the negative results obtained in the struggle against the larvae of this insect are mainly due to the insufficient quantity of the remedy employed.

V. WILLEM. **A new Chironomide or Midge larva, feeding on a Water-lily.** — Académie Royale de Belgique, *Bull. de la Classe des Sciences*, Brussels, 1910, No. 1, p. 33-39.

Belgium

A new kind of midge, a *Cricotopus*, a Chironomid, lives in great numbers in the larval state on the surface of the river Lys, near Ghent in Belgium. The adult midge obtained by breeding, has been examined by Professor J. J. Kieffer, who describes it. These larvae are found in the furrowed parts of the upper surfaces of the floating leaves of the fringed water-lily (Faux-Nénuphar) (*Limnanthemum nymphoides*, Link). The midge-larvae feed on these leaves, mining and burrowing through them.

G. CHAPPAZ. — **A Phylloxeric Decay of the Mourvedre-Rupestris 1202 Vine in Champagne, France.** — *Progrès agricole et viticole*. Montpellier, No 42, 16 October, 1910.

France:
Champagne

In Champagne, France, the writer has observed the damage due to phylloxera in a vineyard where the stocks are Mourvèdre-Rupestris 1202. This hybrid is very extensively used as a stock on account of its resistance to lime soils and in general it may be considered as sufficiently resistant to the phylloxera on account of the great vigour of its roots. The writer adds that there is no need to be unduly alarmed at this case of phylloxera attack, because the vineyard in question had already been enfeebled for some three years past by various affections: "brumissure", pectic disease,

(*maladie pectique*) and mildew, which had prevented the formation of sufficiently strong roots.

It would be as well, however, not to make use of Vine « 1202 » as a stock, except on very calcareous and damp soils.

New Treatment of the Vine-Cochylis.—*Feuille d'informations du Ministère de l'Agriculture*. Paris, No 37, 1910.

Some experiments on the destruction of the *Cochylis* were recently made by the entomologist Catoni. The spray most efficacious as an insecticide is a solution of kgr 0.500 of carbon disulphide and 2 kg. of yellow soap in 100 litres of water. The soap is first dissolved in hot water; the remainder of the 100 litres of water is added cold to the emulsion, and the carbon disulphide is then added while the mixture is stirred.

This solution penetrates amongst the flowers of the grape where the insect lies hidden. The carbon disulphide must be well mixed with the soap to avoid scorching.

Italy

F. T. BIOLETTI and L. BONNET. The Phylloxera in California. — *Revue de Viticulture*. Paris, No 877, 6 October 1910, pp. 371-375.

Owing to the distance between vine growing centres and to special climatic conditions, the phylloxera, reported in California since about 1884, has not caused such great havoc in this country as in Europe. Its progress is very slow, but for several years past the work of replanting the vineyards has been going on. The experiments which have been made so far tend to show that the *Rupestris du Lot* is well adapted to deep soils and hot regions, while the *Riparia-Gloire* and the 3309 are adapted for cooler places and shallow soils.

United
States:
California

P. NOËL. The Enemies of the Plum and the Olive. — *Bulletin du Laboratoire régional d'entomologie agricole*. Quatrième trimestre de 1910 (October-November-December 1910). Rouen, Imprimerie E. Caquiard, 1910, p. 16.

Soils which are slightly moist and calcareous are best adapted to the plum of which many varieties form a very profitable culture.

France

Paris imports annually 2 500 000 kg. of *Reine Claude* and 1 500 000 of *Mirabelles*.

The plum is liable to the same pests as the pear and the cherry. A list of the enemies of this valuable tree is given and includes figures of 254 insects and 7 fungi.

The olive, like the vine, is a southern plant, and unhappily it also is exhausted by over-production and the lack of manure. The olive tree loves light, heat and a well manured, substantial, and above all well drained soil; stagnant humidity near the roots must be carefully avoided.

When insufficiently manured, the olive has numerous enemies, and M. Noel gives a list comprising 40 harmful insects, 3 fungi and a bacterial disease.

H. A. BALLOU. **Scale Insects (Coccidae) which attack the Citrus Limetta.** (Notes on Lime cultivation). — *West Indian Bulletin*, vol. XI, No 1, pp. 19-49. Barbadoes, 1910.

Barbados

The principal Scale-insects which attack the *Citrus-Limetta*, or lime, are the "Purple," "White" and "Green" scale. Under the designation of "green scale" are comprised the *Lecanium viride* and *Lecanium Hesperidum*. It has only been known since 1905 that the *Lecanium viride* was to be found in the Lesser Antilles.

The natural enemies of these insects are two: insects and fungi. Amongst the insects are the Coccinellidae, or Lady-bird beetles and Hymenoptera parasites. The species *Scymnus* and *Pentilia* of the Lady-bird beetle are particularly useful.

Cyclonida sanguinea and *Megilla maculata* feed mainly on Aphididae, or Plant-lice, and are not of much use in repressing scale-insects, although they are frequently found on the limetta citrus.

The Purple Scale is frequently the victim of at least one species of tiny Hymenoptera, and the Purple, White and Green Scale Insects are all attacked by fungi of which at least four useful species are to be found in the West Indies: the *Red-headed Fungus*, the *Black Fungus*, the *Shield Scale Fungus* and the *White Headed Fungus*, of which the first three species are found, as is well known, in Montserrat.

Insects and other Invertebrates injurious to Man and to Animals.

S. T. DARLING. **Factors in the Transmission and Prevention of Malaria in the Panama Canal Zone.** — *Abs. Nature*, No. 2135, Sept. 29, 1910, p. 401.

Panama

A memorandum on the "factors in the transmission and prevention of Malaria in the Panama Canal zone" by Dr. S. T. Darling has appeared in the *Annals of Tropical Medicine and Parasitology*, Vol. IV, No. 2.

Some interesting observations and experiments are described on the development of the ordinary malaria parasite and the mosquito of malignant tertian ague, and on the infectious power of the different local species of Anopheles.

The *Celia Albimana*, the common white-foot mosquito, is a very resistant species, and is the principal agent in spreading the malady.

The *Celia tarsimaculata* is almost as dangerous as the *Celia Albimana*; the *Arribalzagia malefactor*, in spite of its name, does not carry infection.

Incidentally, the writer has come to the conclusion, that the characteristic buzz of the mosquito is not due to the vibration of its wings during flight, but to its proboscis.

Legislation on the Protection of Plants.

WEST. Fruit Tree Inspection in British Columbia. — *California Fruit Grower*, Oct. 8, 1910, San Francisco.

The reports on the importation of orchard plants which have recently been sent to the Government by the Provincial Inspector of Plant Diseases will give some idea of the development of the fruit industry in British Columbia. The number of trees and plants inspected at Vancouver during the first four months of 1910 was 2 718 056, each plant being inspected as it passed through the station.

Canada:
British
Columbia

The orchards will cover a large part of the arable land of the province, and the fruit is of the same size, colour, taste and generally excellent character as that grown in the famous orchards of the States of Washington and Oregon.

Apples have been grown successfully at a height of 4500 feet (1368 m.) near Rossland.

The inspection of fruit imported from British Columbia is very severe and impartial. East Canadian fruit is condemned as promptly as American fruit if it is not sound and free from all insects and disease.

Insecticide and Fungicide Regulations. — *The Canner and Dried Fruit Packer*, Vol. XXXI, No. 14, p. 26. Chicago, Oct. 13th, 1910.

A new law, similar to the *Food and Drugs Act*, was passed in April, 1910 to prohibit the adulteration or false declaration of insecticides and fungicides. A Commission has been nominated by the Departments of the Treasury, Commerce and Labour, and Agriculture, to draw up the regulations,

United
States

but the manufacturers and vendors of these products have first had an opportunity of presenting their remarks on this subject at the Public Conference which was held on October 29th last at the Bureau of Chemistry.

Provisions against Locusts in Argentina. *Bulletin of the Pan American Union*, October, 1910, Washington.

Argentina

The Agricultural Defence Committee, which was specially constituted for the purpose of controlling locusts, has taken the following decisions: The zones exposed to locusts are to be divided into three categories: agricultural, pastoral and unoccupied. The cultivators of the first two categories must give notice of the presence of locusts to the authorities within 24 hours after their appearance. For the destruction of this pest the proprietors must pay for at least one workman per 50 hectares of tilled land and one workman per 500 hectares of pasture. The Railway Companies must, on the contrary, pay for three workmen per kilometer invaded. The zinc plates (which are used for the purpose of making noise) will be furnished gratuitously.

This outlay will be covered by a special tax. The government will have to convoke a Conference with neighbouring States for the purpose of arranging a common plan of action in the struggle against locusts. A prize of 100 000 gold *argentinos* has been offered to the person who discovers an economic and not dangerous method of destroying locusts.

Provisions against Phylloxera at the Cape of Good Hope. — *The Gardeners' Chronicle*, No. 3642, London, October 15th, 1910, p. 284.

**South
African
Union:
Cape
Colony**

"We have received a communication from the *Acting Trade Commissioner* of the South African Union, calling attention to an extract from the *South African Union Government Gazette* of August 19th, 1910. This extract explains the rules to be followed in order to prevent the diffusion of the *Phylloxera vastatrix* in the wine-growing districts of the Cape of Good Hope. Among other measures there is one requiring that all imported trees, plants, tubers, roots, bulbs, etc., should be accompanied by a declaration stating explicitly that there are no vines nor parts of vines among them; and this declaration should be accompanied by a certificate from one of the Government Commissioners of the port of entry affirming that the plants introduced are exempt from disease, are not attacked by insects, and that they are quite free from *Phylloxera vastatrix*. The importation of grapes into the division of Graff Reinet is prohibited.

INTERNATIONAL INSTITUTE OF AGRICULTURE

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THE INTERNATIONAL INSTITUTE OF AGRICULTURE.

The International Institute of Agriculture was established under the International Treaty of June 7th, 1905, which was ratified by 40 Governments. Seven other Governments have since adhered to the Institute.

It is a Government Institution in which each Country is represented by delegates. The Institute is composed of a General Assembly and a Permanent Committee.

The Institute, confining its operations within an international sphere, shall:

a) Collect, study, and publish as promptly as possible statistical, technical, or economic information concerning farming, vegetable and animal products, the commerce in agricultural products, and the prices prevailing in the various markets;

b) Communicate to parties interested, also as promptly as possible, the above information;

c) Indicate the wages paid for farm work;

d) Make known the new diseases of vegetables which may appear in any part of the world, showing the territories infected, the progress of the diseases, and, if possible, the remedies which are effective;

e) Study questions concerning agricultural co-operation, insurance, and credit in all their aspects; collect and publish information which might be useful in the various countries for the organization of works connected with agricultural co-operation, insurance, and credit;

f) Submit to the approval of the Governments, if there is occasion for it, measures for the protection of the common interests of farmers and for the improvement of their condition, after having utilized all the necessary sources of information, such as the wishes expressed by international or other agricultural congresses or of congresses of sciences applied to agriculture, of agricultural societies, academies, learned bodies, etc.

The Institute publishes: *a*) a Monthly Bulletin of Agricultural Statistics; *b*) a Monthly Bulletin of Agricultural Intelligence and Diseases of Plants; *c*) a Monthly Bulletin of Economic and Social Intelligence.

It has also published a volume on "The Organization of Agricultural Statistical Services in the Several Countries", and a volume "Statistics of Cultivated Areas and of Vegetable and Animal Production in the Adhering Countries" (an Inventory drawn up from documents published by Governments).

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NB. The Intelligence contained in the present Bulletin has been taken exclusively from the books, periodicals, bulletins, and other publications which have reached the Library of the International Institute of Agriculture in Rome during the month of November, 1910.

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The Editor's notes are marked [Ed.].



Development of Agriculture in Different Countries. — Scientific Institutions.
— Education in Agriculture and Forestry. — Experimentation. —
Biography. — History of Agriculture.

PH. ARBOS. **The Plain of Roussillon, France.** — *Annales de Géographie*,
Paris 1910, No. 104, pp. 150-168.

The rainfall of the Roussillon district has contributed to give its vegetation a special character. The rivers of this region are chiefly torrents, but notwithstanding the irregularity of their flow they have been extremely useful to farmers in their efforts to control drought. Numerous canals water the plain, and the distribution of irrigation-water takes place according to very strict regulations. In times of scarcity of water, the *Syndicats* substitute for the old regulations a series of measures, which vary according to the different places, but are governed by a single aim. Thus, waterings of small account are prohibited, preference being given to those crops which would suffer most from drought or which were considered important at the time when the statutes were drawn up. Arthur Young was struck by the fertility of the irrigated valleys in the midst of "dry and sterile" Roussillon.

France
Roussillon

The extension of the vineyards, which occupied more than half the cultivated area in 1903, their extraordinary development along the coast plains and the substitution of the American for the native stock have been finally economically very disastrous for the district. Cereals and grass-land have almost entirely disappeared except at Aspres, where at one time they were the only cultivation and yielded but poor returns. The vine alone seems able to adapt itself to this soil and climate. To the south of the river Tet, there are still some grass-lands along the coast, and they are gaining ground since the crisis in the wine trade.

But it is especially above Perpignan that meadows of high fertility and fields under various cultivations in regular rotation are found mingled with the vineyards. The gardens form a fresh and verdant belt around Ille

and Perpignan, which, thanks to the hot sun and irrigation, yield a varied abundance of early produce. The gardens are on rich soil, protected from the North wind either by their position or by cypress or laurel groves; they grow chiefly legumes and other early vegetables, the famous Perpignan artichokes and "Rival" asparagus. Ille, Elne and Perpignan are the three great forwarding centres; about 7000 tons of fruits and early vegetables being exported yearly.

The prosperity of the market gardens, notwithstanding the crisis in the wine trade, has caused such a rush towards horticulture that fears are entertained of a crisis in this industry also, due to over production, to the conservatism of gardeners and exporters, and due also to the distance of Roussillon from the great centres of consumption.

Royal Committees in Hungary for Agricultural Advice. — *Les Institutions agricoles hongroises.* Edition du Minist. Royal Hongr. de l'Agriculture. Budapesth, 1910.

Hungary

In all the Hungarian towns where there are Agricultural Academies, in Magyaróvár, Debreczen, Kassa, Keszthely and Kolozsvár, there are also Royal Committees for Agricultural Advice. They give suggestions as to the management of farms, draw up leases, make agricultural valuations, and give practical teaching on book-keeping, etc.

Advice is given gratuitously but the travelling expenses of the experts have to be reimbursed according to a fixed tariff.

SERÉNYI. Developing Agriculture in Hungary. — *Revue de Hongrie*, Budapesth, No. 5, 1910.

The present state of the world's market shows the necessity for increasing the agricultural production of Hungary, a country within reach of markets where she could very largely develop her trade. All outlay for increasing production is fully justified.

Hungary

In spite of her great fertility, Hungary produces much less than the Western countries, whose soil and climate are less favourable for agriculture; this is true not only for cereals, but for fruits, vegetables, butcher's meat and other animal produce. One of the most urgent tasks for the Government is that of encouraging cattle raising, especially pig breeding. Instructions have been given to competent agents to furnish stock breeders, especially small proprietors, with breeding animals as cheaply as possible. The Department of Agriculture undertakes to pay from 10 to 30 per cent of the purchase price of these animals, allowing easy conditions as to payment.

Measures have also been taken to increase forage-production and improve pastures. Dairying is also being helped. Lastly, the Government is helping

in the rapid and cheap transport of Hungarian produce to Western markets, both by land and water. In some parts of the country the land distribution requires improvement and the Government is encouraging colonisation and the forming of small holdings.

CISCHINI. Development of Agriculture in Spain.—*Ber. der K. K. Oesterr.-Ung. Konsularämter (Barcellona)*, 1910. Wien.

Spain is trying to improve its agriculture. The average wheat yield in Valencia, Saragossa and Barcelona is not more than 10 hectolitres per hectare, while in Almeria it is scarcely 5 hectolitres. The extent of agricultural progress is indicated by the increasing importation of agricultural machinery and fertilisers; the first has doubled in two years and the import of fertilisers has increased by 20 per cent. But the effects of drought are still grievous in this excessively dry country, where 53 per cent only of the whole area is cultivated and where it is estimated that there is still at least 32 per cent which could easily be brought under culture. During recent years, works of reforestation, canalisation and reservoir construction have been undertaken.

Spain

The Spanish production of wheat, which was about 25 million metric quintals in 1905, had increased in 1909 to 39 millions. The rye, barley and maize crops are very poor in comparison with the area cultivated.

There is a great falling off in the cultivation of the vine and in the quantity of wine produced in Catalonia, owing to the crisis which lasted until 1909, and to the tardy substitution by American stocks in the vineyards invaded by phylloxera. The trade in the best Spanish wines has suffered considerably by adulterations carried on in foreign markets.

The olive groves in Spain are almost equal in extent to those of France, Italy, Austria, Portugal, and Greece taken together, but olive-cultivation also has deteriorated. Much however is being done to control the diseases and improve the olive and oil production. The citrus fruit industry keeps at a steady level: about 132 citrus trees per hectare are grown in Valencia.

The number of cattle and sheep have decreased considerably in Spain.

MAURICE CHALHOUB. Agriculture in Finland. Extract from *La Finlande*, Paris, H. Le Soudier, 1910, p. 581.

About 70 per cent of the population of Finland are engaged in farming, the principal source of her wealth. The most varied methods of culture are employed: from fertilising only by paring and burning the soil to the most modern systems of crop rotation. The general rule is a rotation of two or three years so that a part of the land always lies fallow. Improved rotations were introduced on some of the most important farms only recently.

**Russian
Empire:
Finland**

The lowering of the lake levels and the draining of swamps have extended cultivation, and the use of modern mowing and threshing machines and of artificial manures is becoming rapidly more general even in outlying districts.

Rye is cultivated over 14 per cent of the total area of arable land, barley over 6 per cent, and oats over 19 per cent. The rest is cropped with wheat, potatoes, flax, hemp, grass, forage-plants and vegetables. Rye and wheat are sown in August; they spring up during autumn lying buried under the snow until spring. In South Finland rye is harvested at the end of July. Oats and barley are sown in the spring and reaped after the rye harvest.

As the land is cut up into small holdings, the poorest peasant is able to acquire a farm, and for this reason nearly all the soil belongs to the peasants. The State possesses 38 per cent of the land, which is almost entirely covered by forests; 2 per cent belongs to the Communes and the Church, and the rest is owned by private persons and is land mostly under cultivation. There were 110 629 landowners in 1901, and 160 525 tenants.

The Finland Society of Domestic Economy, to which the great development of potato cultivation is due, succeeded in obtaining in 1836 an Imperial Charter for an Agronomical Institute, to which the immense domain of Mustiala was given. The first director of the Institute was S. Gripenberg, who did much to improve the breed of milch cows. The opening of this Institute marked the real beginning of agricultural progress in Finland. After the great land holders W. Baeckman, A. von Daehn, Julius Frey, Aug. Armfelt and G. J. Silfversvahn, had introduced crop-rotations the system soon spread throughout the country. Agricultural Congresses became frequent; the Mortgage Society (*Société hypothécaire*) was founded; special schools were instituted to teach the principles of farming, while State and provincial teachers in agriculture were appointed to enlighten the peasants.

But the Society of Domestic Economy was insufficient for all the needs of the country, and by degrees several private Societies were founded and have done much to second the Government in its efforts to improve agriculture. The Private Society of Domestic Economy was founded at Uleaborg in 1828, the Agricultural Society of the Government of Viborg in 1847, the Agricultural Society of the Governments of Nyland and Tavastehus in 1856, and in 1858, 1861, 1862 and 1863 the Societies of St. Michel, Knopio, Satakunta and Vasa.

These Societies superintend some of the Agricultural Schools and all the Dairy Schools which have sprung up since 1860, and they have organised on their own account competitions and Agricultural Shows and have each in their particular districts encouraged cattle breeding and appointed school-gardeners and teachers in the manual arts.

The State has granted large subsidies to these Societies. In other parts of Finland there are less important Societies with similar aims. Another

Agronomical Institute was founded at Kronoborg in 1874, and there are also 24 training agricultural schools in Finland.

In order to improve the dairy industries, cattle-breeding was attended to and it is to N. Grotenfelt that the chief reforms in this respect are due. The State has always encouraged dairying by improving the meadow and grazing lands and helping to utilise the wealth in water of the country. The lands long ago laid bare by forest fires in the Savolaks and in Carelia are now covered every summer with rich pastures, producing abundant and excellent milk.

The Institute of Mustiala has opened a model Dairy School where young men and women are prepared for teaching improved dairy methods all over Finland. In 1905, there were 37 schools for herdsmen, besides numerous practical dairy schools.

Finland butter, which is very much appreciated on foreign markets, is mainly exported to Russia and England. The amount exported in 1905 was valued at 38 000 000 frs. or £1 520 000.

Horse breeding is being improved both by the Government and by private Societies. The Finland horse, probably of Tartar origin, is small but very robust, with intelligent eyes, broad shoulders, deep and well arched neck, powerful haunches and very hard hoofs. His endurance is remarkable. There are about 325 000 horses and colts in Finland; of these from 1500 to 3000 are exported to Russia and Sweden every year.

The people in Finland are every day becoming more convinced that the forests must be properly cared for and turned to account, and some very able foresters have been trained by the Evois Forest Institute, whose former director, A. Blomqvist, has greatly contributed to the improvement of forestry. The Finland Forest Society, founded in 1877, has also been doing its part, and has organised well attended congresses. Indeed, the fears which have been expressed as to the probability of forests disappearing from Finland are unfounded, especially as the climate is very favorable to reforestation.

The Finlanders are interested in every branch of horticulture, and gardening has been raised to an industry, almost to an art, by G. Niklander, M. G. Stenius, and many others, whilst B. Lindberg and Miss Alexandra Smirnoff have improved Finnish fruit-tree cultivation. There are two Horticultural Societies, one at Helsingfors the other at Kuppis, near Albo. A prosperous school is attached to the Helsingfors Horticultural Society, supported by Government, and a dozen other horticultural schools are at work in different part of the country.

STEVENS. **Agriculture in the Caucasus.** *The Board of Trade Journal.* London, Oct. 27, 1910, No. 726, p. 169.

About 20 per cent of the land in the Transcaucasian provinces was uncultivated.

In the government of Elisavetpol there are still 669 339 acres of land lying fallow.

Russian
Empire:
Caucasus

The production of cereals in the Caucasus is improving, and the cultivation of tobacco, lately introduced, is becoming rapidly more important on account of the suitability of climate and soil. The *Mahorka* variety of tobacco is the only one cultivated in the district of Nuha, where it is grown on an area of 17 000 acres (6 868 hectares).

The cultivation of cotton is also spreading. The area at present cultivated is more than 113 000 acres (45 719 hectares) and yields an average of 18 000 tons; it is of excellent quality and sells at a high price.

The cultivation of liquorice is steadily extending.

Tea plantations have increased from 1 000 acres (404 hectares) in 1905, to more than 2 000 acres in 1910, with a yield of more than 150 000 lbs. (67 950 kg.).

The sunflower is very widely cultivated, the seeds furnishing oil which is largely consumed by the poorer classes.

Land-reclamation and Drainage in the Straits Settlements. (Drainage Works).—*The Board of Trade Journal.* London, Nov. 10, 1910.

Straits
Settlements

The Governor of the Straits Settlements has decided, in addition to other works of less importance from an agricultural point of view, to have the lands near the Penang Road raised to a higher level and to begin the improvement of the Balestrier Road Swamp by draining it. In addition to this, a plentiful supply of water will be carried over to the districts of Bukit Seraya in Wellesley, and Lumut in Dindings.

ARTHUR P. VAUGHIN. **Colonisation in Japan.** — *The American Review of Reviews.* New-York, Nov. 1910, p. 573.

Japan:
Hokkaido

The population of Japan increases yearly by about half a million. The Government is encouraging internal colonisation rather than transoceanic emigration; Formosa, Korea, Sakhaline and Manchuria could take several million settlers, but the region which emigrants have for a long time preferred is the Hokkaido or Yezo Island, where they find a cooler and drier climate than in the Main Island and in the extreme southern islands of the Japanese Archipelago.

In Yezo there are mountains covered with fine forests, and fertile

alluvial plains, and allotments are granted on very favourable terms in order to encourage the poorest settlers. The Government founded the Imperial Agricultural College, now the University of Sapporo, for the purpose of introducing Western methods of cultivation. Each settler receives free from the Government 5 *chobu* (about $12\frac{1}{2}$ acres, or 5 hectares) of land, on condition that it is cleared of forest and a certain portion put under cultivation within three years. For the first twenty years the land is free of taxes.

There are also military Colonies, where each head of a family not only receives the same extent of land as the other settlers, but the Government also builds him a modern house with granaries, etc. These military Colonies are flourishing, and comprise a population of about 10 000. The settlers have no taxes to pay for 30 years, but are liable to be called for military service in the reserve.

Agricultural Conditions in the Philippines.—*Philippine Agricultural Review*. Manila, No 9, 1910.

Anyone acquainted with existing conditions in the Philippines understands that their agricultural progress cannot but be slow. The occasional wealthy "hacenderos" and farmers coming to these Islands from other countries provided with both capital and knowledge of modern agricultural methods could find no richer field for immediate and rapid development. The average farmer in the Philippines is generally neither wealthy nor equipped with any knowledge of modern agriculture. Farming here is largely in the hands of small holders, who are, as a rule, conservative and poor, and the most difficult problem at the present moment is to effectively reach this class of farmers.

Philippines

The Safata-Samoa Company's Plantations in Samoa. (Safata-Samoa Gesellschaft). — *Deutsche Kolonialzeitung*. Berlin, Nov. 5, 1910.

This Company has three plantations, at Saninoga, Tuamainato and Falelannin, on which 145 000 cacao trees, 68 000 *Hevea*, 2 000 *Ficus* and 6 000 cocoa nut trees are cultivated, in addition to a large number of coffee plants. The *Hevea* and the cacao trees are already beginning to yield. An excellent road has been opened between Apia and Sangoga, and the port at Apia will have to be enlarged to facilitate exportation.

German
Samoa

LAIDLAW. Lands for Settlement and Forest Reserves in the Consular District of Portland, Oregon. — *Diplomatic and Consular Reports*. No. 4558, London, Sept. 1910, p. 3.

The report of the Secretary for the Interior shows the following public lands vacant and available for settlement in the British Consular District

United
States:
Montana
Oregon
Washington
Idaho
Alaska

of Portland, Oregon; but these lands are of all qualities, many of them being unsuitable for agriculture and remote from centres of transportation:

In Montana . . .	42 900 229 acres
» Oregon . . .	18 225 694 »
» Washington . .	3 198 645 »
» Idaho . . .	90 119 805 »
» Alaska . . .	368 016 038 »

In Montana, during the first half of 1909, nearly 5000 homestead entries were filed, covering about 1 000 000 acres of land mostly in the so-called dry-farming sections of the State.

The area of forest reserves of the Federal Government is stated to be

In Montana . . .	20 389 696 acres
» Washington . .	12 065 500 »
» Oregon . . .	16 227 368 »
» Idaho . . .	20 099 029 »
» Alaska . . .	26 761 626 »

Some large tracts in Oregon, held by owners of grants made long ago to military road companies, are now being offered for sale to settlers. One of these grants, aggregating 900 000 acres, from Lakeview, Oregon, to the Idaho boundary, was cut up into 7000 10-acre lots, all irrigable, 4000 20-acre lots, and the remainder into lots of from 40 to 1000 acres.

The vendors also undertook to provide works for the purpose of irrigating such portion of the lands as could be reached and required water. A constant demand exists for lands irrigated under Federal and State Acts. Many of these projects are nearly completed and others are being inaugurated. The railways, now beginning to penetrate the great district of Central Oregon, will open an immense area hitherto devoted to cattle and sheep. There is a decided tendency to cut up large farms into smaller holdings, particularly in the case of lands suitable for fruit growing.

ROSE PENDLETON CHILES. **Agricultural Progress in the Southern States of the United States of America.** — *The American Review of Reviews*. Nov. 1910. New York, pp. 563-572.

Six years ago an important agricultural reform in the Southern States of the North American Union was precipitated by the scare caused by the appearance of the boll-weevil in Texas.

To restore confidence, the Bureau of Plant Industry founded in 1904 the *Section of Cotton Demonstration Work* eventually known as the *Farmers' Cooperative Demonstration Work*.

Dr. Seaman A. Knapp, first head of this section, showed at once that a good yield of cotton could be secured in spite of the weevil.

By planting an early variety of cotton, maturity is secured by intensive culture before the weevil reaches the destructive stage. Wherever the insect is observed the affected parts of the plants are removed and burned.

With these precautions planters no longer dread the boll-weevil.

The work of the new Section is not limited to saving the cotton crop. Owing to insufficient capital and want of technical instruction agriculture in the Southern States was in a very backward condition.

Dr. Knapp began by instituting demonstration fields, under the superintendence of a competent working staff.

Beginning with an acre at a time, the farmers were persuaded to make fair trial of scientific methods, with the result that within three years the whole farm was brought under the new system. The demonstrators on their monthly visits, insist on very strict book-keeping, the results of which go far in helping to convince the farmers.

The funds for the Demonstration service are furnished partly by the Federal and Local Governments, partly by Societies and private individuals.

From one in 1904, the number of demonstrators increased to 430 in 1909; from one State the work has extended to thirteen; from one farm to 60 000 farms, representing 53 436 acres cultivated in cotton and 39 058 in maize.

The cotton showed an increase in 1909 of about 13 750 bales, and the maize of 609 304 bushels. It is calculated that the annual revenue of the farmers has been increased in this way by about four million dollars.

One of the most interesting results of the movement has been the formation of *Boys' Corn Clubs*.

The object, under Prof. O. B. Martin, is to interest boys between 10 and 18 in maize cultivation. They begin under the instruction of Government agents, upon an acre each, the land being provided by their parents. A strict account has to be kept and a yearly report sent in to the Bureau of Agricultural Industries.

In 1909, forty-six thousand boys were thus being trained in scientific farming. In one county of Mississippi they obtained an average of 74 bushels of maize to the acre, while the farmers of the county, employing old methods, made an average of less than 20 bushels.

In South Carolina, in 1909, one of these boys obtained a yield of 152.5 bushels of maize per acre at a cost of 31 cents a bushel. He won the county and State prizes, and also a special prize offered by Dr. Knapp, consisting in a trip to Washington.

Another boy obtained 122 bushels per acre at a cost of 14.5 cents a bushel.

These and two other boys were presented with the first certificates of merit ever given to youthful farmers.

Next year all boys raising 75 bushels of maize per acre, at a cost not exceeding 30 cents a bushel, will receive certificates of merit.

B. LUIS. The Chief Cultures of the Isthmus of Tehuantepec (Mexico).

— *Journ. Agric, Tropicale*. Paris, Oct. 30, 1910, No 112, p. 301.

One of the chief obstacles to the development of agriculture in this region is the lack of means of communication. Mexico does not produce anything like the quantity of maize necessary for the country labourers, *peones*, for whom it is the staple article of diet.

Most of the settlers (nearly all of whom are citizens of the United States of America) have begun to cultivate rubber, cacao trees or sugar cane, but nothing definite can be said for the next five or six years as to the results of *Castilloa* cultivation in the Isthmus. Cacao has given encouraging results everywhere, but is not cultivated to any great extent. Sugar cane is doing remarkably well.

At the present moment, however, the only agricultural undertaking which is really flourishing is cattle raising. The native cow, worth about 75 frs., crossed with a foreign bull, gives good results. It is said that the greater part of the Isthmus is being gradually transformed into a vast grazing area.

Banana plantations have recently been started along the railway towards Santa-Lucrecia, and if well managed, ought to give good returns.

JOS. A. ARNOLD. Catalogue of Publications of the Department of Agriculture of the United States.

— *United States Department of Agriculture. Publications for Sale. Division of Publications.* Circular 8, Washington, June 15, 1910.

This Catalogue contains the list of publications of the Secretary's and of the following Bureaus:

Animal Industries, Biology, Chemistry, Entomology, Experimental Farm Stations, Textile Fibre Investigations, Foreign Markets, Forestry, Library, Vegetable Industries (including the Divisions of Agrostology, Botany, Pomology, Vegetable Physiology and Pathology), Divisions of Publications, Public Roads, Soils, Legislation, Statistics and Meteorology.

Bocas del Toro, Panama. *Peru To-Day*, vol. II. No 5, July 1910, p. 23. Lima.

The great valley of Sixaola, in the most northern province of Panama, Bocas del Toro, is connected by rail with the port of Almirante in the Bay of Bocas del Toro, and is the most important region in Central Ame-

Mexico:
Tehuantepec

United
States

Panama

rica for the production of bananas. The United Fruit Co., which owns the Sixaola plantations, exports an average of 300 000 bunches of bananas every month. The Company owns fifteen other plantations in the territories of Cricamola, Chiriqui Grande and Changuinola, comprising altogether 6 800 hectares of land. The Company employs 3 000 men, mostly natives of Jamaica, whose wages vary from 0.75 dollar to 1.50 dollars per day. Nearly 3 million dollars have been spent on the Changuinola plantations, which yield 3 000 000 bananas yearly.

In addition to bananas, the province of Bocas del Toro produces a certain quantity of maize, cacao, rubber and cocoanuts; 75 000 of the latter were exported during the second half of 1909.

The Government is actively forwarding the construction of roads through the most important regions of the country, till now inaccessible. Modern agricultural methods are being introduced.

Public Lands in Panama. — *Peru To Day*, Vol. II, No. 2, April 1910. Lima.

Since the passing in Panama of the law on public lands (Law 19 of 1907) a noticeable movement for their occupation and colonization has taken place. The lands are divided into *tierras baldias* and *tierras indultadas*; the former belong to the Government as Trustee for the whole nation and extend from the crest of the Cordilleras to the Atlantic coast. The latter (freed lands) occupy the Pacific slope, and belong to the people by patent from the Spanish Crown.

Panama

The law of 1907 provides for the disposal of these lands to settlers at reasonable prices, the *tierras indultadas* being sold at 2.50 dollars per hectare to new applicants and 0.50 doll. to old settlers desiring to secure a title for their holdings. The price of the *tierras baldias* is 1.00 doll. per hectare up to one hundred hectares, when it increases by 5 cents per hectare for each successive hundred hectares. These prices are very low, and leave but a small revenue to the Government when the cost of surveying, registering titles, etc., has been covered.

Two hundred applications for land have already been made in the Province of Colon, and a large number also in other provinces.

The Department of Fomento is busy opening up roads, and within a short time the habitable parts will be within reach of settlers, and colonization will become more active. Certain parts of the *tierras baldias*, which are occupied by hostile Indians, are not likely to be opened up by settlers for some time yet.

CARTWRIGHT. Trade and Commerce of Ecuador. — *Diplomatic and Consular Reports*, N. 4360. London, 1910.

Ecuador

Agriculture has made great progress during the year in the coast district of Ecuador. A new Company has been formed to work and develop

the *Tenquel* cacao and rubber plantation, which is of vast extent and has a great future before it. The Company has the right of extending its field of operations and probably the important neighbouring properties of *Pagna Chaguana* and others will be worked later on.

In London various projects are in hand for new cacao and rubber plantations, and some German syndicates are working large properties in the country.

The chief want for the further development of production in Ecuador is labour.

GARAICOECHEA. *The Germania Estate in Argentina.* — *La Quinzaine Coloniale*, Paris, Nov. 10, 1910.

Argentina

One of a number of large farms in Argentina which yield considerable profit to their owners, the *Germania*, is situated to the north-west of Buenos Ayres and extends for a distance of 13 leagues. There are 17 000 head of cattle on this farm, mostly Herefordshire Shorthorns, 1000 Lincoln sheep, and more than 2000 horses and 1100 milch cows. The farm work is done by Englishmen, according to scientific methods. Several hectares are cultivated as orchard and kitchen garden. A railway station is situated on the farm.

M. A. CHEVALIER, *Agricultural Trade in the Valley of the Niger.* — *L'Agriculture commerciale*. Paris, Nov, 27, 1910.

French West Africa: Nigeria

Eleven years ago trade in French Nigeria consisted of barter from village to village and a native traffic in salt bars from Timbuctu and in Kola nuts. Now there is a trade in agricultural produce estimated as follows for the year 1910: 200 tons of Macho wool; paddy, about 15 000 tons of sorghum and millet; earth nuts; picked cotton, gums, skins, bees-wax, Karité butter (1); and 20 000 head of oxen, sent from the mouth of the Niger to the Gold Coast. The trade in these products is only just beginning, and preparations are being made for opening a trade in other articles: sesame, Karité kernels, *neté* (2), *Da* (3), a fibre resembling jute, *ronier* kernels, which might take the place of *corozo* (4), and potatoes, of which the Europeans are getting as good yields on the banks of the Niger as in France.

(1) *Butyrospermum Parkii* (Sapotaceae).

(2) *Parkia africana* R. Br.

(3) *Hibiscus cannabinus* L.

(4) Vegetable ivory, *Phytelphas macrocarpa* (Palmae). [Ed].

The Ivory Coast Production. (Il movimento commerciale della Costa d'A-
vorio), — *Bollettino della Società Geografica Italiana*. Rome, Novem-
ber 1910.

Rubber is one of the chief agricultural products of the Ivory Coast, and is furnished in abundance by the *Puntumia* and *Landolphia*. The various forms in which it appears in trade are called *Niggers*, *Twists*, *Cakes* and *Lumps*. The value of the yield is nearly 7 000 000 francs.

The production of Palm oil is also large, the value being about 4 000 000 francs. The country also produces mahogany, cacao and kola-nut, but in comparatively small quantities. It is not a country producing only one staple like French Guinea, but rubber constitutes half the agricultural wealth of the Ivory Coast Colony. The forest reserves are also very important (1).

French
West
Africa
Ivory Coast

Agricultural Production of Fernando Po and Spanish Guinea. (Gli stabilimenti spagnuoli del Golfo di Guinea). — *Bollettino della Società Geografica Italiana*, Rome, Nov. 1910.

The principal production of Fernando Po is cacao, which has increased from 1 499 050 kg. in 1902 to 2 779 264 kg. in 1909; the whole of this product goes to Spain, because the export dues for foreign ports are prohibitive. The plant is sometimes attacked by a disease (*pina negra*) which causes much damage.

Rubber of the *Landolphia* species is abundant in Guinea, and attempts are being made to acclimatise the *Hevea* at Fernando Po; there are already two plantations of 3000 and 500 trees respectively, which yield a larger quantity of *latex* than is obtained in the *Hevea* cultivations in Kamerun.

Maize is largely cultivated in Guinea, and the forests are rich in mahogany, ebony and red-wood.

Fernando Po
and
Spanish
Guinea

Kismayu and Juba. (Kisimayu und der Juba). — *Oesterreichische Monatschrift für den Orient*. Wien, Nov. 1910.

The middle and lower course of the Juba follows the frontiers of Italian Benadir and of the British province of Jubaland, the principal centre of which is Kisimayu, where nothing grows but a few cocoa palms.

The natives of the Hinterland raise oxen, goats and sheep. Along the

Italian
Somaliland,
British
East
Africa

(1) "The natives cultivate maize, plantains, bananas, pineapples, and other fruits; European coffee culture is successful, especially in Elima near Assinie; coco-nuts and rubber are collected. The mahogany forests inland are worked."

The Ivory Coast, in *The Statesman's Yearbook*, 1910, p. 807. [Et].

river, on the British side, extensive cotton plantations have been started, with a steam plough and machinery for irrigation.

On the Italian side, opposite, towards Giumbo, vegetation is luxuriant. Kisimayu exports about 200 000 rupees worth (1 rupee = 1.65 frs.) of ox, goat and sheep skins, maize, sheep, oxen, rubber, buffalo butter and sesame. The maize comes from Goscia.

An Italo-Belgian Company has started agricultural and transport works. The systemisation of the Juba and Tana Rivers, for transport and irrigation, will greatly help to develop the agriculture in this region.

H. J. CHOLIS. **Agriculture in Natal.** (Agriculture. Province of Natal, The Union of South Africa). — *The Times*, November 5, 1910. p. 25. London.

South
African
Union:
Natal

Owing to the favourable climate and general conditions of the country farming has made remarkable progress during the past few years in Natal, in spite of the cattle disease "East Coast Fever," which has been raging of late. This disease, brought from Zululand after the war, has been decimating the herds since 1906. The oxen alone have decreased by 60 000 head (an average of 12 to each farmer), consequently all efforts have been concentrated on the raising of sheep, the number of which has risen from 587 150 in 1905 to 916 998 in 1909.

The cattle disease has interfered with the production of meat and of milk on the one hand, and on the other has made transport and farm labour extremely difficult, thus influencing the production of maize, one of the chief crops of the province.

The disease continues to spread in some parts of Natal but in others there is evidence of improvement, and some spans of "salted" cattle, *i. e.* oxen that have recovered from the disease are to be seen. They are held to be immune from further attacks. Meanwhile, the farmers have been turning their attention to the question of mechanical traction and tillage, and some plantations are already being worked by mechanical power.

Natal is divided naturally into three zones, the Coast Belt, the Midland Belt and the Upland Belt.

The Coast Belt is comprised between the rivers Umtanvuna and Tugela, and is from 16 to 49 kilometers wide. It is suited to the cultivation of sugar, tea, maize, tropical fruits, acacias, tobacco, cotton, arrow root, indigo, etc. Coffee also grows well in some parts, but is not cultivated over very great extents. The main products everywhere are tea and sugar. From 16 000 to 20 000 hectares are under sugar cane, and produce 85 000 tons of sugar and 2200 tons of molasses yearly, as well as large quantities of rum and methylated spirits. The tea plantations (2404 hectares) produce

6800 quintals of tea. Another important agricultural industry of the Coast Belt is fruit culture.

Cattle bred on the coast thrive well here, but the same cannot be said of sheep. Nearly all the farm labourers are indentured Hindus. The men are paid from 10s to 15s (12.60 to 18.90 frs) a month, and the women 5s to 7s 6d (6.30 to 9.45 frs) a month, and all Indians who settle in the Colony at the end of their engagement are paid from £1 to £2 (25.25 to 50.50 frs) a month. Most of the farms in this region are from 200 to 1000 acres in extent (80 to 400 hectares), but there are some under 50 acres (20 hectares).

The chief industry in the Midland Belt is cattle raising (oxen, horses, sheep); and maize, barley, oats, haricots, potatoes and turnips are cultivated, and also wattle for tanning. Nine-tenths of the wattle bark exported from Natal into Europe, where it is used in the tan-yard, are produced in this region. Tobacco also promises to become an important product.

Stock farms have an average extent of from 1500 to 8000 acres (600 to 3200 hectares), about $4\frac{1}{2}$ acres (1.8 hectare) being necessary for each head of cattle, and $1\frac{1}{4}$ acre (half an hectare) for each sheep, that is where no provision is made for artificial feeding during the winter. The farms near Pietermaritzburg or Durban, or in the neighbourhood of railways, have an extent of between 200 and 600 acres (80 and 240 hectares).

The farms in the Upland Belt support large numbers of live stock, all branches of which do well. 36% of these farms are from 1000 to 2000 acres (400 to 800 hectares) in extent, and 20% from 2000 to 3000 acres (800 to 1200 hectares). The crops grown are much the same as in the Midland Belt.

Tea plantations. — The best tea plantations are situated about 1000 feet (300 metres) above the sea level; they require a hot and moist climate, and there are large tracts of land well suited to this culture.

Sugar cane. — There are 8000 men employed in this industry, at 34 factories which represent a capital of more than £1 000 000 (25 million francs). It could be greatly increased, however, by a proper selection of the varieties of cane, by improvements in cultivation and in the methods of extracting the sugar, etc.

Black wattle (Acacia melanoxylon). — This plant, which is a native of South-East Australia, is perhaps the most characteristic of all cultivations in Natal, and the one which has been most useful to the country from several points of view. It reaches full bearing within a few years after being planted, and continues practically for ever. It yields a good return for the outlay, without demanding any special knowledge in its cultivation, and gives a high value to soils unsuited for ordinary cultivation. There are about 150 000 acres (60 000 hectares) under black wattle in Natal, which produce nearly 24 000 tons of bark per year, besides wood which is used for fuel and for

props in the mines. Bark to the value of £11 (275 frs) was exported in 1886; in 1891 to the value of £5588 (150 000 frs.), in 1901 £69 850 (1 750 000 frs.) and in 1909 £192 950 (4 872 000 frs.).

Fruit culture. — All the fruits of the temperate and tropical zones grow well in the various regions of Natal. There are between 2000 and 3000 acres (about a thousand hectares) under fruit trees.

Navigating Agricultural Show in Sweden. (Die Schwedische schwimmende Pflanzenkultur-Ausstellung). — *Die Ernährung der Pflanze*. Stassfurt, Nov. 1910, N. 21, pp. 205-208.

Very few people in Sweden, especially among the rural population, are able to visit Agricultural Shows, on account of the distance and the expense of the journey.

Sweden Mr. G. Fraenckel, of Gothenberg, with other persons has therefore organised a show on board ship.

A demonstration ship, voyaging along the coast of Sweden, making numerous calls, has been fitted up. It has sections dealing with agriculture, entomology, plant diseases, etc., and samples of grain, models, coloured maps, etc. are shown.

Experiments are carried out on the ship to demonstrate the good effects of chemical manures.

The article in *Die Ernährung der Pflanze* is accompanied by numerous illustrations.

WOODHOUSE. West Siberian Exhibition of Agriculture at Omsk, Summer of 1911. — *Diplomatic and Consular Reports*. No 4551. London, 1910.

Russian Empire: Western Siberia In the summer of next year, 1911, an exhibition of the agriculture, forestry and industry of Western Siberia will be held at Omsk. The main object of this show, the first of its kind in Siberia, is to make generally known the unlimited resources and increasing productiveness of Western Siberia, and to attract foreign exhibitors interested in Siberian trade. Foreign exhibits will be admitted free of import duties.

CORNELL. The Siam Agricultural Show. — *Philippine Agricultural Review* Manila, No 9, 1910, p. 555.

Siam The First Annual Agricultural Exhibition in Siam was inaugurated this year in Bangkok. In addition to the numerous paddy exhibits, there was a model farm with paddy fields and rice under cultivation, and the methods of irrigating and fertilizing them.

A steel plough drawn by a buffalo, to be used in the dry season was also exhibited as well as exhibits from a pine apple plantation under cultiva-

tion, and ninety different varieties of grasses which grow in the rice fields. The results of experiments conducted with tobacco were shown, and Siamese, Sumatra and Havana plants were exhibited. Samples of cotton raised in Siam were also on view. Considerable space was devoted to sericulture, which has become an important industry. The Irrigation Department exhibited models of schemes for irrigation. There were also exhibits of fruit, horses, cattle and poultry.

Horse Show in New York. — *The Times*, Nov 16, 1910.

The winners of the "Blue Ribbon" have been bought for the price of £. 5000 (126 250 frs.). This is the highest price that has ever been paid in the United States for a pair of carriage horses.

United
States:
New York

Agricultural Show in Kamerun. (Landwirtschaftliche Ausstellung in Nord-kamerun). — *Deutsche Kolonial Zeitung*, Berlin, Nov. 19, 1910.

A Colonial Agricultural Show has been inaugurated at Dikoa, and seeds, cotton, cattle, horses, sheep, goats and fowls are among the exhibits, as well as ploughs and other agricultural machinery. The natives are taking part in the exhibition, and show a lively interest in it.

Kamerun

The show has given proof of the agricultural importance of North Kamerun, which would develop very considerably if that district were connected with the coast by railway.

VERDIANI. Hungarian Agricultural Museum at Budapest. — *Bulletin mensuel de l'Office de renseignements agricoles*, Paris, No. 7, pp. 1026-1040, 1910.

The Agricultural Museum at Buda-Pest is an important institution, and undoubtedly first among those in existence.

The museum is divided into 28 sections: 1) *Agricultural Statistics*; 2) *Agricultural Geology*; 3) *Cultivation of Wheat*. Wheat is grown on a quarter of the whole cultivated area of Hungary, and this section contains a remarkable series of samples of wheat gathered during 10 years. 4) *Plants and their Diseases*; 5) *Useful and Injurious Animals*; 6) *Horticulture*: horticulture in Hungary owes its development to the Government, which has done and is still doing everything in its power to encourage horticulturists by granting them all sorts of facilities. For this purpose the State has 36 nurseries, which distribute large quantities of fruit tree stocks for grafting, and seeds.

Hungary

Section 7) *Grapes and Vines*, is also very important, not only because of the famous Hungarian vines, but because 60 000 hectares of once sandy and waste lands are now covered with thriving vineyards, due to the initiative of the State.

8) *Experiment Stations*; 9) 10) 11) *Dairy Farms, Agricultural and Domestic Industries*; 12) *Labour*; 13) *History of Agriculture*; 14) *Meteorology*; 15) *Agricultural Implements and Machinery*; 16) *Agricultural Buildings*.

Section 17) *State Lands*, is an exhibition of the work of the four model State farms, Babolna, Fogaras, Kisbér and Mezöhegyer, and also of the Farm of Gödöllő: 18) *Horse Breeding*, is also a very important section, the value of the annual exportation of horses from Hungary being between 20 and 30 million crowns. 19) *Veterinary Service*; 20) *Cattle Raising*; 21) *Primitive Industry*; 22) *Special Agricultural Instruction*; 23) *Land Drainage*; 24) *Bee-keeping*; 25) *Silk-worm Breeding*; 26) *Forestry*; 27) *Fishery*; 28) *Game*.

Chemical Institute and Agronomical Stations in Hungary. — *Les Institutions agricoles hongroises*. Edition du Minist. Royal Hongrois de l'Agriculture. Budapest, 1910.

Hungary The Agricultural Chemical Institute of Hungary and the Central Experiment Station at Budapest, as well as the Agricultural Chemical Stations of Debreczen, Kassa, Keszthely, Kőszvár, Magyaróvár, Pozsony and Fiume, carry out chemical analyses connected with agriculture. The stations of Debreczen, Kassa, Keszthely and Magyaróvár also make chemical experiments bearing on the development of agriculture. All these stations have official authority in legal questions concerning the manufacture and sale of artificial wines and the repression of frauds in agricultural products.

Royal Experimental Milk Station at Magyaróvár. — *Les Institutions agricoles hongroises*. Edition du Minist. Royal Hongr. de l'Agriculture. Budapest, 1910.

Hungary This Station studies dairy questions, examining milk and its derivatives and making investigations on the practice of dairying, in order to give suggestions and advice to farmers. The Station organises milking competitions, examines dairy utensils, the working of co-operative and other dairy farms, reports on the production, manipulation and utilisation of milk, and undertakes to develop and spread instruction in dairying.

Germany **The New Königsberg Institute for Dairying.** — *Milch Zeitung*. Leipzig, Nov. 1910, No. 46, pp. 529-532. (Der Neubau der Königsberg Molke-reigenossenschaft, das neue Heim der Versuchsstation und Lehranstalt für Molkerei-Wesen, Institut der Landwirtschaftskammer für die Provinz Ostpreussen).

The object of this Institute is to assist in providing the town of Königsberg with an abundant supply of pure milk, to make investigations and

experiments, and to spread instruction in all branches of dairying. A plan of the new building is given in this article, as well as several illustrations of the various sections of the Institute.

The German Colonial Institute at Hamburg (Germany). — *Bull. de l'Office colonial*. Melun, III, No. 32, August 1910, pp. 252-254.

The Law of April 6th, 1908, gave considerable satisfaction to German merchants, who had for a long been wishing for a Colonial Institute. This Institute is not intended to be simply a specialised centre of education, but also a Central Bureau of Intelligence for all questions relating to the Colonies, and for the publication of scientific results of interest to countries colonised by Germans. Thus, the Institute has two distinct sections: the Educational Section and the Central Office. Everything connected with the first is the province of a Council of Professors, the President and Secretary of which are elected for two years. The teaching staff, numbering twelve professors, is under its orders, as also the lecturers (of whom there were 35 in the year 1908-1909). The lectures are attended both by students and hearers.

Germany

The Central Office, as well as the Council of Professors, is under the direction of the Commissioner of the Senate, and its mission is to keep in touch with persons having Colonial interests, to supply information, to furnish useful documents to scientific institutions, and to keep itself well informed, both from an economic and scientific point of view, on all Colonial questions.

L. AIDLAU. Agricultural Demonstration Trains in the United States. — *Diplomatic and Consular Reports*. No 4558. London, 1910, p. 9.

Following a practice inaugurated two or three years ago, American railway companies send out over their lines trains fitted up with all kinds of machines and appliances for demonstrations in every branch of agriculture, even carrying live poultry, and in some instances milch cows. Teachers are on these trains, lecturing at each place where the train stops. Large gatherings of farmers await the arrival of these educational trains, which hitherto have been very successful.

United States

G. E. NESOM. School and Home Gardening. — *The Philippine Agricultural Review*, Vol. III, No. 10, October 1910, p. 599, Manilla.

The Bureau of Education published a bulletin in September entitled: *School and Home Gardening*, by C. H. Magee, S. C. Kelleker, N. H. Foreman, and others. Gardening and elementary agriculture as outlined in this bulletin are now prescribed for all elementary schools in the Philippines.

Philippines

This publication, which marks the beginning of a new departure in the Educational System in the Philippines, is the first step towards popular agricultural instruction.

W. H. CADMAN. **Work of the Department of Agriculture and Technical Education in Egypt.** — Trade and Commerce of Alexandria. *Diplomatic and Consular Reports*. No 4554. London, 1910.

Egypt

The Department of Agriculture and Technical Education continues to do excellent work in Egypt. It has already planned, built and equipped eight agricultural and horticultural schools, each adapted to the special needs of its locality.

Others are in course of construction. Most of the expense has been met by voluntary contributions from the people of the provinces. The demands for admission to five of these schools, which were completed at the end of last year, exceeded 2000. These two facts indicate a growing desire for education of a practical nature. Increased interest is being taken in this matter since the recent modification of the Organic Law enabling the Provincial Councils to utilise part of the land tax for educational purposes.

The Department is endeavouring to persuade the Councils to use these additional funds for the foundation of practical schools of agriculture. Two of these have already been planned in the provinces of Menufia and Dakhalia. The advice and assistance of the Agricultural Department is in great demand in Egypt and will be much more needed in the near future (1).

TUDHOPE. **The Work of Native Travelling Instructors in the Gold Coast Colony.** — *The Tropical Agriculturist*. Colombo, Oct. 1910. p. 322.

Gold Coast

By order of the Gold Coast Government, native travelling instructors are required, for the most part, to travel and instruct chiefs and native farmers in the best methods of growing economic products and preparing them for the European markets; but they may be employed in such other capacity as the Director of Agriculture may from time to time consider necessary.

The instructors are expected to pay special attention to cocoa, rubber, palm-oil products, cotton and fibres.

(1) Of the Egyptian population over 10 years of age, 62.65 per cent were employed, in 1907, in agriculture. In the year 1897 these existed in Egypt only one Agricultural School, attended by 59 boys. In 1909, the number of boys attending this school was 138. These numbers show, in comparison with what is given in the text, how rapidly in Egypt Agricultural Education has been developed during the last year.

Compare with *The Statesman's Yearbook for 1910*, pag. 1292. [Ed.].

Agriculture. — Agricultural Physics, Chemistry, Botany and Geology.

E. BOURQUELOT and M. BRIDEL. **On a new Sugar, Verbascose, extracted from the Root of the Mullein (*Verbascum Thapsus*).** — *C. R. de l'Acad. des Sc. Paris*, T. 151, No. 18, 31 Oct. 1910, pp. 760-762.

A new sugar, *Verbascose*, has been extracted from the root of the mullein (*Verbascum Thapsus*). By hydrolysis it gives rise to levulose, glucose and galactose. It differs from stachyose in its higher melting point and its greater rotatory power. The mullein root also contains a glucoside decomposed by emulsine.

France

Verbascose is present in larger quantities in the roots of the first year than in those of the second, while glucoside is especially plentiful in the latter.

A. ROSENBERG. **Catalases in Plants.** — (*Ber. der Deutsch. bot. Gesellesch.*, 1919, 28, 280-288). *Journ. Chem. Soc.*, 1910, Nov. Abs. II, 992.

Equal quantities of different seeds, reduced to powder, were digested with water for an hour, and then treated with hydrogen peroxide.

No connection was found to exist between anaerobic conditions and catalase, for seeds of leguminous plants reacted but feebly with hydrogen peroxide, while grains of cereals, though but slightly adapted to these conditions, showed themselves to be rich in catalases.

Germany

Acids, even citric acid at 0.25 %, are injurious to catalase, and acid phosphates of sodium and potassium reduce its activity. Alkaline salts, as sodium carbonate and dibasic phosphates, are favourable to it; the latter especially in the case of seeds containing small quantities of catalases.

The catalase of lupins is soon destroyed by autolysis. The addition of dibasic phosphates protects catalase from decomposition, but the amount decreases gradually with increase of temperature.

The amount of catalase increases during germination. The addition of 0.5 % of nitrate of potassium, sulphate of magnesium, acid phosphate of potassium or calcium nitrate retards this production of catalase.

- C. RAVENNA and O. MONTANARI. **Origin and Physiological Function of Pentosanes in Plants.** — (*Atti R. Acc. dei Lincei*, s. U., vol. XIX, fasc. 4^o, 1910). *Bollettino tecnico della coltivazione dei tabacchi*, Scafati, N. 5, settembre-ottobre, 1910, p. 300.

Italy Experiments made in the Laboratory of Agricultural Chemistry at the University of Bologna upon the horse-bean (*Faba minor*) show that:

1) In the plant under examination, the absolute quantity of pentosane presents a tendency to increase during the day and to diminish during the night;

2) Sugars administered to the leaves cause great increase in the amount of pentosanes;

3) The prevention of chlorophyll action and the absence of carbohydrate nutriment entail a reduction in the amount of pentosanes.

This would show that in the horse-bean pentosanes derive from sugars, and that they may also be considered as reserve materials.

- W. N. LUBIMENKO. **Relation of Amount of Chlorophyll with Energy of Photosynthesis.** — (*Trav. de la Soc. des Naturalistes de St-Petersbourg*, Ser. III, Pt. I, § II). — *Nature*, No. 2141, vol. 85, Nov. 10, 1910, p. 48, London.

Russia Experiments to ascertain the relation between the amount of chlorophyll in a leaf and the energy of photosynthesis. The intensity of light required to start photosynthesis is in inverse ratio to the amount of chlorophyll; with the increase of chlorophyll the energy of photosynthesis increases up to a maximum and then decreases.

Some of the experiments showed that there are two phases in photosynthesis; first, carbon dioxide is decomposed and oxygen liberated, and then certain photochemical reactions cause the translocation and the assimilation of the organic matter.

- JEAN de RUEZ de LAVISON. **Selective Power of the Root in Absorption of Salts.** — *C. R. Ac. des Sciences*, Paris, 17 Octobre 1910, No. 16, p. 675.

France Different substances were made to be absorbed both by the entire plant, and by cut stems. Haricot beans were chosen for the experiments, and equimolecular solutions employed, equal to $\frac{1}{10}$ of the normal solution, of chlorides of sodium, potassium and calcium.

The cut stems absorbed all the salts equally. It is remarkable that great quantities of the different chlorides were absorbed. Plants furnished with roots, absorbed the various salts in the ratio of 1 for chloride of potassium, 0.6 for chloride of calcium and 0.55 for sodium chloride.

HANS MIETH. **Is Calcium combined as Calcium Silicate assimilated by Plants?** (Ist der Kalk des Kieselsauren Kalkes zur Ernährung der Pflanze geeignet?). — *Landw. Versuchs-Stationen*. Band LXXIV, Heft I-III. Berlin, 1910, pp. 81-120.

The writer, after mentioning the great importance of lime in the soil not only as a plant food but also for its other physico-chemical and biological functions, calls attention to the fact that soils naturally rich in lime, or that have been marled, gradually lose calcium carbonate while there is an increase in the quantity of the easily decomposable silicates containing calcium, which are formed by the transformation of silicates and by the action of the calcium compounds in solution on the colloidal silica of the soil.

Germany

The results of experiments extending over two years with cultures of oats in nutritive solutions point to the following conclusions.

- 1) Calcium in silicates is readily and usefully absorbed by plants;
- 2) There is no perceptible difference in the action of the various silicates containing calcium;
- 3) Oat-plants assimilated much more silica than lime.

From this may be deduced:

- 1) The vital activity of plants transforms calcium silicate into silica and calcium carbonate.
- 2) Plants need silica. When kept in nutritive solutions without silica, plants take up small quantities of silica from the glass vessel in which they grow.
- 3) In the soil the easily decomposable calcium silicates, are decomposed by the carbon dioxide produced by the roots, into calcium carbonate and silica (probably colloidal silica). That the decomposition of the silicates in the soil, as first explained by D. Mayer, is due to the action of carbon dioxide, would be confirmed by the observation of Mieth that calcium silicates exposed to the air gradually decompose while they absorb carbon dioxide.

In examining soils it is not exact to consider only the calcium oxide contained in the carbonate. The calcium of silicates must also be considered as a plant food (1).

W. ZALESKI and A. REINHARD. **Action of Salts on the Respiration of Plants and on the Respiratory Enzymes.** — *Biochemische Zeitschrift*. 1910, 27, 450-473; *Journ. Chem. Soc.*, Nov. 1910. Abs. II. 990.

Germany

All the salts contained in Knop's nutritive solution diminish the energy of respiration.

(1) Vegetable growth on vulcanic soils and on other soils not containing lime as carbonate, and the abundant supply of calcium oxide in the ashes of plants growing in these soils, are an evident proof that silicates are good providers of calcium to vegetation.
[Ed.].

An acid reaction is especially harmful, but alkalis also cause a diminution.

Dibasic phosphates considerably increase the formation of carbon dioxide in ground living seeds of *Pisum sativum*, *Zea mays*, and *Lupinus angustifolius*, also in seeds which have been exposed to frost, or killed by acetone.

In *Triticum*, the energy of respiration was diminished. Basic phosphates have a stimulating effect. Phosphates stimulate not only zymases, but also oxydases, catalases, and reductases.

With regard to the quantities and activity of reductase and catalase of different seeds, it was found that the activity of reductases increased in the following order: *Zea* (0), *Triticum* (1), *Lupinus* (10), *Pisum* (480). With catalases, the order is inverted: *Pisum* (10), *Lupinus* (12), *Triticum* (30), and *Zea* (50).

W. ZALESKI. **Reduction Processes in the Respiration of Plants.** — (*Ber. d. deutsch. bot. Gesellsch.*, 1910, 28, 319-329) *Journ. Chem. Soc.*, Nov. 1910. Abs. II, 990.

It has been observed that the reducing action in different seeds is greater in peas, and less in cereals and oil seeds. Wheat and lupins occupy an intermediate position. A certain parallelism exists between resistance to anaerobic conditions and the reducing property of seeds, which is greater in leguminous seeds, and less in cereals and oil seeds.

Acid salts, as acid phosphates of potassium and of sodium, lessen the reducing power of peas; neutral salts act more unfavourably. Alkalis, and still more dibasic phosphates, stimulate the reduction.

P. J. S. CRAMER. **A Method of Selection applicable to Tropical Agriculture.** — *Ann. Jard. bot. Buitenzorg*, 3rd Supplement, I, pp. 461-472, 1910; *Bot. Centralblatt.*, Bd. 114, No. 18, Jena, 1 Nov. 1910, p. 452.

After having distinguished the different methods of selection,—intraspecific, interspecific, and hybridation,—the writer shows the variability of tropical plants in a wild condition, especially of the genus *Coffea*. In discussing the point from which selection should begin, he recommends the explorer to study all the variations of any new species he may find. It is desirable that a special Institute, directed by a botanist, should undertake the breeding of new species by rational selection. There is also need in the Tropics of a Central Institution where not only small samples of seeds could be procured, but larger quantities of selected seeds of agricultural plants. M. Cramer finally describes a practical attempt to carry out his ideas which he has begun at Buitenzorg in Java, thanks to the late M. Treub's support.

Germany

Dutch
East
Indies:
Java

F. A. WAUGH and J. K. SHAW. Plant Breeding in Peas. — *Twenty-second Annual Report of the Massachusetts Agricultural Station*, pp. 168-175. Boston, 1910.

The Horticultural Department of Massachusetts has published the results of experiments on the selection of peas, taking as point of departure the type *Nott's Excelsior*.

The following conclusions may be deduced:

1) The tendency to variation is an hereditary character, especially pronounced when the conditions of environment are most favourable.

2) Variations and fluctuations are more frequent in the reproductive organs, than in the vegetative, as variations in the length of shoots, etc.

3) Contrary to what might have been expected, there is a direct relation between the number of seeds in a pod, and the number of pods on a shoot.

United
States:
Massa-
chusetts

J. E. VAN DER STOK. Essays in Hybridization. (Mededeelingen omtrent kruisingsproven) — (*Teysmannia*, XXI, 1910, pp. 118-124). *Bot. Centralblatt*, Bd. 114, No. 18. Jena, 1 November 1910, p. 453.

Experiments, extending over several years, were made on the hybridisation of different plants cultivated in the East Indies.

A red variety of *Ricinus communis* crossed with the colourless variety, produced intermediate hybrids in the first generation; in the second, differentiation was noticeable (1 : 2 : 1). The hybrids were easily distinguished by their pale red colour from the pure bred individuals which were dark red.

The crossing of a species of *Capsicum* with dark violet pods with a variety bearing green pods produced a predominance of dark violet; after the separation, which took place in the second generation, the number of violet individuals was greater than could have been expected according to Mendel's law.

This law was followed, as far as the colour of the spermoderm was concerned, by two varieties of *Arachis hypogaea*, the darkest maroon-red having complete predominance. With regard to the pods, the characters induced are a little more complicated; signs of serial division showed themselves in the second generation.

Dutch
East
Indies:
Java

PIERRE GEORGEVITCH. Morphology of the Microbes in the Nodules of Leguminous Plants. (Morphologie des microbes des nodosités des legumineuses). — *C.-R. de la Société de Biologie*. Paris, 28 Oct. 1910.

Serbia

M. Georgevitch of the Belgrade University cultivated two species of the bacilli found in the nodules of *Vicia sativa*:

- 1) A sporogenetic variety, short and very motile.
- 2) A longer kind, not motile, in the shape of small rods.

The first of these varieties forms, at the end of 48 hours, in the bacillus, a refrangible spore whence arise always new bacilli not bearing ramifications. A culture of the second kind of bacillus, on potato, and at 35° C, gives rise to branched individuals, from which afterwards young, branched bacilli are produced.

The study of the formation and separation of the members of these bacilli shows clearly, from their mode of development, that the separate segments of a branched bacillus act as spores, and that we are dealing with an arthrospore, for the formation of which the whole mass of segments is used, without modification of form. This development of the segments represents a simplified method of spore formation, and is not the formation of branched coccobacilli, as described by Mazé.

Accordingly, in the nodules of leguminosae only two varieties of bacilli are found, i. e. the two forms described. No coccobacilli occur in the cultures, but only a kind of arthrospore, which has been mistaken for coccobacillus.

A. HARDEN and R. V. NORRIS. **Fermentation of Galactose by Yeast and Yeast Juice.** — (*Proc. Roy. Soc.*, 1910, B. 82, 645-649). *Journ. Chem. Soc.*, Nov. 1910, Abs. II, 989.

Great
Britain

These experiments confirm the results obtained by other workers, and prove that yeast cultivated in a medium containing galactose acquires the property of fermenting this kind of sugar.

A mixture of yeast juice and galactose reacts with phosphates in the same manner as a mixture of yeast juice and dextrose. The fermentation is quickened; a supplementary quantity of carbon dioxide, equivalent to the added phosphate, is produced, then the fermentation pursues its normal course. During the process, an organic compound of phosphorus is formed, which is not precipitated by the magnesia mixture.

Small quantities of sodium arseniate also accelerate the fermentation of galactose.

URBAIN CL. SEAL et A. FEIGE. **Sterilisation of Large Quantities of Water by Ultraviolet Rays.** (Sterilisation des grandes masses d'eau par l'ultra-violet). — *C.R. de l'Acad. des sciences*. Paris, t. 151, No. 18, 31 Oct. 1910, pp. 770-772.

France

The inventors by means of a new arrangement place the source of their light in the centre of the mass of water. The positive electrode which is fixed to the lower part of the apparatus consists of a rod of alumi-

nium with an iron core of 100 mm. The wear and tear of such an electrode is infinitesimal.

This arrangement renders possible the sterilization of water with the consumption of 20 watts per cubic metre.

- A. FERNBACH and A. LANZENBERG. **The Action of Nitrates on Alcoholic Fermentation.** (De l'action des nitrates dans la fermentation alcoolique).—*C.-R. Ac. Sc. Paris*, 24 Oct. 1910, T. 151, No. 17, pp. 726-729.

These researches prove that the presence of nitrates retards considerably the multiplication of yeast cells, the effect being increased by the strength of the dose. On the other hand, it is shown that nitrates are distinctly favourable to the action of zymase. The writers have observed that high doses of nitrates may cause a more prompt fermentation, and in any case prove harmless to the yeast. The beneficial action of the nitrate begins to show itself when the dose is about 5 gr. per litre. The optimum dose of nitrate varies with the nature of the yeast, but in all cases potassium nitrate certainly increases the activity of the zymase.

France

- E. KAYSER. **Influence of Nitrate of Manganese and other Nitrates on Alcoholic Fermentation.** (Influence du nitrate de manganèse et d'autres nitrates sur la fermentation alcoolique). — *C.-R. de l'Acad. des sciences. Paris*, t. 151, No. 19, n. Nov. 1910, pp. 816-817.

The addition of nitrate of manganese, far from hindering alcoholic fermentation, accelerates its starting, causes a more complete disappearance of the sugars, and gives a greater production of alcohol than in the control experiments without nitrate.

France

There appears to exist for each variety of yeast an optimum dose of the manganese salt, beyond which the latter becomes toxic. The optimum dose of the salt produces the maximum diastasic activity: given equal quantities, nitrate of manganese has more effect than nitrate of potassium. The optimum dose depends not only on the variety of yeast, but also on the composition of the culture medium, and on the base combined with the nitric acid.

- M^{me} H. KRZEMIENIEWSKA. **Influence of the Mineral Constituents of Nutritive Solutions on the Development of Azotobacter.** (De l'influence des constituants minéraux des solutions nutritives sur le développement de l'*Azotobacter*). — (*Bull. de l'Acad. des Sciences de Cracovie*, 1910, Bd. 376-413). *Journ. Chem. Soc. London*, Abs. Nov. II, 678.

Russia

Potassium, calcium, magnesium, phosphorus, and sulphur are indispensable to the development of *Azotobacter*. In the experiments described, the

minimum quantities necessary for the normal utilization of one gramme of dextrose are the following, in milligrams:

K, 0.38; Ca, 0.36; Mg, 0.35; P, 2.46; S, more than 0.49 mg.

An insufficiency of any of these mineral substances—essential constituents of nutritive solutions—causes a diminished utilisation of the dextrose, and a decrease in the fixing of nitrogen per gramme of dextrose. The increase of the organisms stops, while respiration processes go on in the existing cells.

Beyond certain limits, the salts of potassium, sodium, and magnesium are toxic to *Azotobacter*. The injurious effect is diminished, or prevented by adding salts of calcium. Salts of magnesium lessen the harmful action of excessive quantities of potassium and sodium.

E. DE KRUYFF. *Torula Bogoriensis rubra*. — (*Ann. du Jard. bot. de Buitenzorg*, 3^e supplément (Treub-Festschrift), 1910, I, pp. 36-39). *Bot. Centralblatt*, Bd. 114, No. 19, Jena, 8 Nov. 1910.

Dutch
East
Indies

A new species of red yeast has been isolated from a solution of manite prepared according to Beyerinck's method, and inoculated with earth from the Botanical Garden at Buitenzorg.

The yeast fixes free atmosphere nitrogen, and secretes amylase and lipase, but cannot ferment glucose, saccharose, maltose, and galactose, forming no alcohol.

Impurities of the Atmosphere over Towns. Effect upon Vegetation. (Agriculture at the British Association). — *Nature*, No. 2140, Vol 85, November 3, 1910, p. 24.

Great
Britain

At the meeting of the British Association held at Sheffield, Drs. Crowther and Ruston spoke on the impurities contained in the atmosphere above towns and their effect on vegetation.

The rain which falls on Leeds is fairly rich in mineral, tarry, and acid substances.

These substances choke the stomata of the leaves of Conifers especially, and contaminate the soil, so that they are doubly harmful to plants, often killing them.

Impure rain diminishes the production of grass, reduces the content of protein and increases the proportion of woody fibre.

Hungary

Royal Meteorological Institute and Observatory in Hungary. — *Les Institution Agricoles Hongroises*. Ed. du Minist. Royal Hongrois de l'Agric. Budapest, 1910.

The Royal Institution of Meteorology and Terrestrial Magnetism at Budapest studies the climatic questions which affect Hungary.

It publishes a daily Meteorological Report giving on a map a forecast of probable temperatures for the following 24 hours.

These communications are sent to institutes, newspapers, and private subscribers; they are sent to 300 telegraphic bureaux where they are exposed in frames arranged expressly for this purpose.

The Observatory of the Institute is at O. Gyalla (Comitat of Komárom, railway station: Ersekujvár). Visitors should write to the Director of the Observatory or of the Institute.

Geological Study of the Soils of Vineyards in the Province of Brescia.

(Studio geologico-vitico dei terreni delle plaghe della provincia di Brescia dove più estesamente è coltivata la vite). Brescia, Tipografia Senghi 1910, p. 150.

This work aims at guiding vine growers in the selection of stocks, and in the necessary experiments in adapting American stocks to the soil. It deals with the topographical, physical and chemical conditions of the soil, and the nature of the rocks whence it is derived.

Italy

Before examining the adaptation of the principal grafting-stock to the soil, attention is drawn to the fact that too much reliance should not be placed on vines «direct producers», for the present. These hybrids often yield those heavy crops of little value which have led to crisis in the wine trade.

Two geological maps and one showing the connexion between the areas under vines and the geology of the province of Brescia accompany this work.

F. M. Methods for Arresting and Utilising Moving Alluvial Mud. (Fixation et mise en valeur des vases mouvantes). — *Revue scientifique*. Paris, Nov. 1910, p. 628.

All the recent Congress of "l'Association française pour l'avancement des sciences" at Toulouse, M. Gèze, who had returned from a scientific mission, described the methods employed in Holland for arresting and reclaiming the moving mud which borders the Rhine and the Meuse near Rotterdam.

Netherlands

Rhizomes of the large rush, *Scirpus lacustris* (*Jonc des Tonneliers*) are first planted, the roots of which rapidly form a thick mat, and gradually raise the level of the land.

As soon as the land is above the reach of the tides, plantations are made of the rhizomes of the rush used for brooms (*Phragmites communis*), which takes deep root and thus completes the work of consolidation.

After this, the mud is fixed and is relatively fertile, and can be transformed into artificial meadows. The constant decay of vegetable debris gradually enriches the soil, kept aerated by the mass of roots below, and after a few years it becomes fit for the cultivation of sugar-beet.

It may be remarked, that the ground was already productive, even when only planted with rushes and reeds, which, used either for litter, or for baskets, mats, etc., afford a source of considerable revenue.

M. Gèze's report is interesting, not only as announcing a successful agricultural experiment, but chiefly because it should be possible to imitate the Dutch in several countries, in the reclamation of extensive lands.

J. B. GUTHRIE and H. J. JENSEN. **The Chemical Nature of the Black Soil Plains in Australia.** (With Notes on the Geological Aspect of the Question). — *Agricultural Gazette for New South Wales*. Oct. 4, 1910, p. 855.

The Department of Agriculture in New South Wales has made some analyses of typical specimens of the black soil of the North West portion of the State.

Common-
wealth
of
Australia:
New
South
Wales

The whole black soil area, which is probably of alluvial origin, is divided between virgin soil and pasture land, some of the richest grazing of the State being found here; it is a very clayey soil of low capillary power; water percolates through it but slowly, with the result that it is exceedingly sticky when wet, and hard and cracked when dry. It is not rich in vegetable matter, although the blackness shows the presence of humus. Further investigations are necessary to ascertain whether this black colour is due to the presence of humus and to its special condition or to salts of iron. The nitrogen content is low, but the soil is rich in lime and potash and other plant foods, and is very fertile, as is shown by the luxuriance of the herbage after rain.

These soils are generally very deep, and by their physical constitution suited to wheat. They are very difficult to work, tillage being possible only in certain special conditions of moisture.

When once broken the surface becomes friable through exposure to the air and the work is easier. The soils are slightly alkaline, but not to the extent of interfering with cultivation, as in the alkali plains of Western America.

All these peculiarities, alkalinity, deficiency in nitrogen, stickiness and hardness, are increased by irrigation from artesian wells.

The soils may be divided, geologically, as follows:

A) *Black peaty soils* of swampy tracts and along water courses. These mainly owe their colour to organic matter and the black compounds of iron produced by the reducing action of organic matter on the higher oxides.

When found in sandy areas, as in the county of Cumberland, this soil generally becomes whitened in consequence of the large addition of silica, while it is reddened in volcanic or rocky districts rich in iron, by the oxidation of the iron compounds. The soils which whiten are generally poor in lime and potash, and have a strong acid reaction.

B) Black soils of the basaltic plains, such as the Darling Downs, Queensland. The colour in this case is indirectly due to the presence of lime derived from basaltic rocks, which favours nitrification and the reduction of iron, and, by accelerating vegetable growth, increases the amount of humus.

These soils are some of the most fertile in the State, and are usually neutral or slightly acid in low-lying lands. Similar soils are found on the slopes of the basaltic mountains

C) Black alluvial soils of the Western Plains, clayey in character, probably deriving their colour from the abundance of lime, humus and organic salts of iron. This soil dries more rapidly than that derived from the decomposition of basalt *in situ*. The *Acacia pendula*, *Eucalyptus Wool-siana* and *Eucalyptus melanophloia* are characteristic of this soil.

D) Black soils of calcareous origin, generally very fertile. When derived from pure limestone rocks free from silicates they are less fertile because deficient in potash and phosphates. But when they result from the disintegration of silico-calcareous rocks they are rich in these substances.

EDWARD JOHN RUSSELL. **Effect of Earth-worms on Soil Productiveness.** — *Journ. of Agric. Science*, Sept. 1910, Cambridge.

These experiments were made at Rothamsted, to determine the action of earth-worms in the formation of nutritive substances for plants, a subject already studied by Wollny.

They led to the following conclusions: Worms seem to have no marked and direct action in the matter, and the decomposition of organic substances, and consequent formation of nitrates, is not greater in the presence of worms, than in their absence.

By the amount of nitrogen which they contain (1.5 % to 2 %) and by their rapid and complete decomposition after death, worms enrich the soil through the addition of a certain quantity of nutritive substances.

Taking Mr. Hensen's figures as correct, 25 000 worms per acre (62 000 per hectare) of arable land, there would be (in the most favourable circumstances) an increase per annum of 620 grammes of nitric nitrogen per hectare (equal to about 3.6 kg. of sodium nitrate), due to the decomposition of these organisms.

The effect which worms have upon the fertilization of the soil is a mechanical and indirect one, for by their burrows they contribute to its drainage and aeration.

Great
Britain

W. B. BOTTOMLEY. **Assimilation of Nitrogen by certain Nitrogen fixing Bacteria in the Soil.** (Proc. Roy. Soc. 1910. B. 82, 627-629). — *Jour. Chem. Soc.*, Nov. 1910, Abs. II, 988.

Great
Britain

Nutritive solutions were respectively inoculated with pure cultures of *Azotobacter* from garden soil; with pure cultures of *Pseudomonas* from the tubercles of kidney bean roots and of clover; and with these two bacteria together. While *Azotobacter* alone fixed 2.17 mgr. per unity of carbohydrate and *Pseudomonas* alone fixed 2.30 mgr., the two micro-organisms together fixed 4.51 mgr.

Other experiments are described in which 140 gr. of soil, with and without the addition of lime, were inoculated with an extract of soil which was first sterilized and then inoculated with *Azotobacter* and *Pseudomonas*. This was done in order to obtain the greatest adaptation of the micro-organisms to the conditions prevailing in the soil. In 10 days, there was an increase of 35 mgr. of nitrogen in the mixed cultures in the soil treated with lime, while the increase was 25 mgr. in the soil not thus treated. The amount fixed by the culture alone was 6 mgr.

S. J. ALWAY, E. K. FILES and R. M. PINCKNEY. **Determination of Humus in the Soil.** — (*Journal of Industrial and Engineering Chemistry*, 1910, 2, 317-322). *The Analyst*, Vol. XXXV, n° 416, pp. 495-496.

United
States

Different methods for the determination of humus in the soil were compared, understanding by *humus* that brown or black part of soil which is soluble by dilute alkalis.

The conclusions are as follows:

- 1) Hilgard's method gives good results, but presents certain difficulties when soils are rich in humus, and have a particularly good physical consistency.
- 2) Huston-Mc Bride's method (the official American method) gives, in general, results which are too high, and not convincing.
- 3) Moore-Hampton's modification of the official method gives reliable results, and with many soils, is more rapid than Hilgard's.
- 4) The power of solutions of ammonia of dissolving humus depends on their concentration. Solutions of 16-28 % dissolved most.

In these experiments solutions of ammonia at 4 % were used.

- 5) The quantity of *ashes* obtained from the humus varies according to the method employed, and is not dependent on the concentration of the ammonia solution used.

The official method gives 4 to 38 times the weight of ashes obtained by other methods.

The greater part of the ashes, obtained by each method, is probably not an essential constituent of the humus, and it would be well always to state the quantity of ash found, together with that of the humus, as the first serves is some measure as a control to the figures of the second.

Baryta in Soils. — *Nature*, 2141, vol. 85, Nov. 10, 1910. London.

Mr. Failyer, of the Bureau of Soils of the Department of Agriculture in the United States, publishes in Bulletin No. 72 a number of analyses showing that barium is to be found in the greater part of the soils of that country.

The amount sometimes reaches 0.1 %.

It seems probable that solutions in the soil which play an important part in plant nutrition contain salts of barium. Felspar is also a source of barium.

United
States

Cases have been observed of the occurrence of barium in the ashes of plants.

The presence of barium in forage plants may possibly be harmful to the animals which feed on them, and perhaps explains some unexpected results produced in feeding.

B. SCHREINER and J. J. SKIMMER. Effects of a harmful Organic Soil Constituent. — *U. S. A. Dep. of Agriculture. Bur. of Soil.* Bulletin 70, pp. 98 + tabl. XLV + fgs. 31. Washington, 1910.

A long series of researches on the harmful action of dihydrostearic acid is described.

B. Schreiner had previously discovered this substance in soils, especially in such as were rather unfertile.

United
States

The experiments were carried out with cultures of wheat in a series of 66 solutions containing, in every possible proportion, phosphoric acid, ammonia, and potash, varying in the proportion of 10 to 10 % of the total concentration of 80 millionths.

The chief results obtained can be summed up as follows:

- 1) Dihydrostearic acid (50 millionths) hinders the development of wheat cultivated in distilled water, and also in the various culture solutions.
- 2) Its harmful effects are greatest when the proportion of nutritive substances is not suitable to the wants of the plant, less when this proportion is favourable, and still less when the nitrogen predominates over the phosphoric acid and the potash.
- 3) Dihydrostearic acid sensibly modifies the absorption of nutritive substances by diminishing the amount of phosphoric acid and of potash taken up, and by either augmenting, or leaving unaltered, the quantity of nitrogen absorbed.

4) Dihydrostearic acid has also the effect of blackening and dilating the extremities of the roots, of hindering their development, and it often makes them bend in the shape of a hook, and also diminishes their oxidizing power—this explains the beneficial effect of fertilizers which favour oxidation.

5) The best development of wheat was observed when the culture solution contained all the nutritive constituents. The most favourable proportion of these constituents was: 30-60 % potash; 30-60 % nitrate of soda, and 10-30 % monocalcic phosphate.

OSCAR LOEW. **Soil-Sickness.** — *Report of the Physiologist. Annual Report of the Porto Rico Agr. Experiment Station for 1909*, pp. 15-18.

Porto Rico

It has been shown that the condition of "sick," or "tired" soils in Porto Rico is usually accompanied by the presence of a considerable number of the microbes of butyric fermentation. A suggestion was made to disinfect the soil with a solution of tricresol, a substance quite harmless to plants. The absorptive power of the soil probably lessens the poisonous properties of this compound.

As butyric ferments develop rapidly amongst decomposing roots which contain sugar or starch, the use of lime would certainly prove beneficial; for lime neutralizes the acids which are formed and the calcium salts produced are entirely oxidized by moulds.

HJALMAR VON FEILITZEN. **Experiments on the Penetration of Frost in Boggy and Sandy Soils.** (Ergebnisse einiger Messungen über die Stärke der Frostschrift während der Wintermonate der letzten drei Jahre 1908-1910 im Moorboden und Sandboden in Flahult und Torestorp, Schweden). — *Der Kulturtechniker*, XIII Jahrg., No. 4, Breslau. Oct. 15, 1910, pp. 277-288.

Sweden

Frost penetrates the soil to different depths according to its capillary power, the specific heat of the strata, the moisture content, etc., and experiments have been made by the Experimental Station of Flahult on the high and low boggy soils (*Hoch- und Flachmoor*) as well as upon sandy soils, to determine the degree of penetration of frost in soils of different kinds.

Similar experiments have been made also at the Experimental Park at Torestorpssossen.

In order to measure the depth of frost, five or six holes were made with an iron rod and the depth was then taken with a decimeter, the depth of the snow covering the soil being measured at the same time.

The measurements were made once a month and the dates of the frost and thaw registered.

The experiments were made during the winter from 1907 to 1910, and in each of the three winters the depth of penetration and the duration of frost were different. The greatest thicknesses of the frozen surface were on an average as follows.

Experimental Station at Flahult:

BOGGY UPLANDS (HOCHMOOR).

	1907-8	1908-9	1909-10
Uncultivated land	14.0 cm.	38.8 cm.	18.0 cm.
Ploughed land	16.2 »	29.8 »	23.6 »
Drained land	20.6 »	33.8 »	18.6 »
Cultivated fields	21.8 »	43.8 »	25.6 »
Meadow	20.4 »	36.4 »	19.2 »

LOW-LYING BOGS (FLACHMOOR).

Field	23.0 »	48.0 »	21.2 »
Meadow	18.2 »	53.2 »	16.4 »

SANDY SOIL.

Field	24.6 »	57.6	22.6 »
Meadow	— »	52.0	21.6 »

Torestorp Experimental Station:

LOW-LYING BOGS.

Field	20.6 »	45.8 »	15.7 »
Meadow	15.5 »	28.3	4.7 »

SANDY SOIL.

Field	16.6 »	68.4 »	17.2 »
Meadow	14.0 »	43.6 »	14.2 »

It will be observed that on deep, undrained bog lands the frost penetrates more slowly through the moss than through the heath on bogs that are drained, or through ploughed land. In the first case, in two years out of three, the frozen crust was thinner. In springtime, the uncultivated soil thawed more slowly than the others under experiment; in 1909 it was not completely thawed until June 10, and in 1910 on May 6, that is, 38 and

13 days later, respectively, than in ploughed land, and 25 and 13 days later than in the deep peaty land that had been drained but not cultivated. This is explained by the poor conducting power of ploughed *sphagnum* soil.

Boggy soil that has been drained and covered with heath freezes more slowly than ploughed land without vegetation, but the frost goes deeper and is much later in thawing. Deep boggy land, tilled and cultivated, freezes much deeper than uncultivated soil, but thaws more rapidly in spring.

The same thing may be observed with superficial bogs that have been simply tilled, but these freeze even deeper and thaw more quickly.

The experiments on sandy soil showed that the frozen crust is sometimes thicker, but thaws earlier than in other soils. Meadow lands are not easily penetrated by frost, and have always a much thinner frozen crust than simply tilled lands.

Statistical tables and a diagram are given in the original paper.

Irrigation Stations and School of Foremen for Irrigation and Drainage in Hungary. (Ecole des maîtres d'eau en Hongrie). — *Les Institutions agricoles hongroises*, édition du Minist. royal Hongrois de l'agriculture. Budapest, 1910.

Hungary

Stations of Agricultural Engineers have been established at Arad, Besztercebánya, Brasso, Budapest, Debreczen, Kassa, Kolozsvár, Komárom, Miskolcz, Nagyenyed, Nagyvárad, Nagyszeben, Pécs, Pozsony, Sátorlajauhely, Székesfehérvár, Szombathely and Temesvár.

These stations assist farmers in drainage and irrigation works and in the regulation of water courses, etc., and even undertake such works as they consider of public utility.

The stations give advice on soil improvement schemes, design the plans for projected undertakings, draw up the estimates and devise the means of carrying them out. Permission to use the services of these stations is granted on request by the Ministry of Agriculture. The service is gratuitous, the expenses of the engineer, or the foreman only being charged. The labourers, carts, etc., used in the preliminary survey must be gratuitously provided by the persons interested.

The School for Drainage and Irrigation Experts trains a technical working staff for employment under the Stations of Agricultural and Hydrographic Engineers, hydraulic Societies and private individuals, for levelling and regulating land, for hydraulic constructions, dykes against inundation, the regulation of rivers, etc.

Entrance to the school is granted either by the Minister, or by the Direction of Hydraulic Works, to the agents of irrigation companies, or to private individuals.

Candidates for admittance must not be under 18 nor over 30, they must have a strong constitution, be of good conduct, have passed at least the 2nd class of a secondary school (gymnasium, technical school, etc.) or have the rank of non-commissioned officer. The non-commissioned officers of the engineer reserve regiments have the right of priority of admission. Private students receive lodging, board and gratuitous medical service. Those students who are in the employ of companies, or of individuals, pay, for complete board and for writing and drawing materials, 60 crowns per month.

The course lasts 3 years; it begins on December 1st and finishes in March. The students are admitted free of charge in the spring and go through a preliminary course, until the regular course commences.

M. GERLACH. Researches on the Composition and Quantity of Percolation Water. (Untersuchungen über die Menge und Zusammensetzung der Sickerwässer). — *Centralblatt für Agrikulturchemie*. Leipzig, Okt. 1910, No. 10, pp. 647-653.

As the result of researches made on 11 plots of ground in the Province of Posen, where the annual rainfall amounts to 500 mm. and the infiltration into the soil is 20%, the following annual losses per hectare have been computed.

Lime	kg. 215
Potash	» 6.3
Total Nitrogen.	» 11.8

Germany

There is no loss of phosphoric acid. This acid is not washed out from the soil, even when it is bare of vegetation. The nitrogen contained in the soil in the form of nitrates is carried away. No ammonia has been found in drainage water. Four unmanured plots lost greater quantities of nitrogen than manured plots.

The greatest loss of potash occurred in light soils. It is probable that sandy soils cannot be permanently enriched with potash.

The amounts of lime lost were great. The experiments did not confirm the idea that lime is more easily removed by water after manuring with salts of potash. The greatest loss of lime took place in unmanured soils. The amount of magnesium removed by water is also considerable.

STANTON. A Sudan Reservoir. — *Travel and Exploration*, London, No. 16, 1910.

West of Omdurman, extending right down to Korti in Dongola there is a vast wady, or depression, known as the Wady Mokattam, some two

Sudan

hundred feet below the level of the Nile at Khartum, and some sixty miles from it. It is known that the Nile falls about three hundred and fifty feet between Khartum and Abu Hamed, at the upper end of the great bend. The depression is nearly two hundred miles in length and varies from one to three miles in breadth. Wells are found in considerable numbers in parts of the wady, and it is remarkable that the level of the water in them varies with the level of the Nile. The Kababish Arabs, the principal tribe in this part of the desert, state that the Wady Mokattam was at some remote date the old bed of the Nile before it took the great bend round by Abu Hamed. Even to this day, when heavy rains fall in these deserts, as they sometimes do, the water rushes down this watercourse to the Nile at Korti in a stream over one hundred yards wide and several feet deep. It would almost seem as if the traditions of the Kababish Arabs are correct and that a prehistoric race once lived where to-day no water is to be found. At one spot the remains of a strong fort of cut stone perched high on the top of a hill are visible, while the nearest water is now over thirty miles distant. Petrified forests, too, are to be seen, with trunks of trees over a yard in diameter, showing that at some period this now waterless desert was covered with thick forest. If a canal were dug from the White Nile some thirty miles above Omdurman and connected with this wady, and a dam built across its mouth at the narrowest part near Korti, an enormous volume of the flood-water, which at present escapes to the sea, could be impounded for use when the river is low and water badly wanted in summer.

Energy from Waterfalls in Sweden and Norway. — *The Times Engineering Supplement*, Nov. 16, 1910, p. 15, London.

Sweden
and
Norway

The Governments of Sweden and Norway have been very much interested of late years in some projects for utilising electric power on certain State Railways, and in various industries. According to a recent report, the Government of Sweden, which has been buying up waterfalls for the past fifteen years, has now enough falls at its disposal to produce 545 145 HP, the Numedal Fall alone being estimated at 164 000 HP. This power is not yet utilised, although many projects have been made.

Sweden is ahead of Norway in the utilisation of hydraulic power; the State decided in 1906 to utilise the great Trollhättan Falls to the extent of 80 000 HP, and the plant for half this power has already been put up and began to work this year.

The Royal Hydraulic Power Council is also building an electric station for 50 000 HP at the Porjus Falls. When the works on the lakes above the Station have been completed, as well as those on some portions of the River Luie, the State will have at least 300 000 HP at its disposal.

The Riksdag has voted 21 500 000 kr. (28 595 000 frs.) for the hydraulic station at Porjus and the railway from Porjus to Gellivare.

Preliminary investigations are being made for regulating the out flow from some of the large lakes and rivers and for the utilisation of the waterfalls bought by the State, and a complete inventory has already been begun of the hydraulic power of Sweden. According to a brief report published in 1903, the State then owned 267 waterfalls.

The power now owned by the State is estimated at 670 000 HP (63 000 already utilised), which can be used during nine months of the year.

GERLACH. Irrigation of Light Soils. (Versuche über die Bewässerung des leichten Ackerbodens). — *Mitteilungen des Kaiser Wilhelms Instituts für Landwirtschaft in Bromberg*, B. III., H. 1, p. 6-7. Berlin.

Experiments continued since 1906 have already given the following results:

- 1) Irrigation of light soils has increased the crops in every case.
- 2) The increase of the crops is not always satisfactory unless irrigation is accompanied by heavy manuring. Water can not be used advantageously on light soils without large quantities of nitrogenous fertilisers.
- 3) The certainty of the result is very largely dependent on the time when the soil is watered, which should be when the plants are in full vegetation
- 4) When the quantity of irrigation water is not more than 20 m/m deep at a time, its temperature may be as low as 5° or 6° Centigrade.

Germany

KRÜGER. New Irrigation Experiments. (Die Ackerbewässerung). — *Mitteilungen des Kaiser Wilhelms Instituts für Landwirtschaft in Bromberg. (Abteilung für Meliorationswesen)*. Bd. III, H. 1, pp. 15-20. Berlin.

Remarkable results have been given by irrigation experiments on various cultivations with constant manuring, in continuation of those made in previous years, at the Farm Station of the Emperor William Agricultural Institute at Bromberg. The main object of the experiments was to determine the influence of the period, duration and amount of irrigation on crops and the net profit.

Germany

The experiments were made with potatoes, oats, kidney-beans, and cabbage, and irrigation by absorption was applied by flooding and watering with a hose, previous experiments having shown that furrow-irrigation gave negative results. During the first year (1909) the rainfall, from April to July, was 164 mm.

Potatoes. — Two series of experiments were made:

of short duration: July 17, August 17 . . . days 62
 » long » May 15, Sept. 10 . . . » 118.

The best results were obtained with prolonged watering, and hose-watering was of greater advantage than absorption; the quantity of water distributed varied from 500 to 2400 cubic metres per hectare.

The following results were obtained:

Increase of produce	15 300 Kgs. per Hectare
» of starch produced	3 400 » » »
Percentage of starch {	Non irrigated plots . . . 17.2 %
	Irrigated plots 21.6 %
	Increase . . . 4.4 %
Increase of gross yield. . . .	fr. 471 per Hectare
» of net profit	fr. 304 » »

The most profitable proportion of water was 1200 cubic metres per hectare, distributed at the rate of 10 m/m in depth each time, the net profit being 0.27 fr. per cubic metre.

Peat compost used as top dressing gave no result.

Oats. — Two series of experiments were made on light sandy soil, by hose-watering:

a) from May 13 to July 3 . . . 52 days 140 m/m water
 b) » » 29 » 4 . . . 26 » 100

The following increase was obtained:

	a)	b)
Grains	1540 kgs.	860 kgs. per hectare
Gross value	370 frs.	221 frs. » »

Early watering, because the spring was dry, gave an increase of 148 frs. per 400 cubic metres of water, corresponding to 0.40 fr. per cubic metre.

Dwarf beans. — Grown in sand: hose-watering gave the following results:

	Increase of yield	Increase of profit
950 m/m of water	700 kgs. per hect.	frs. 147 per hect.
1800 » » »	3200 » » »	» 668 » »

Cabbage. — Grown on clay soil: hose-watering gave the following results:

	Increase of profit	Profit per cub. met of water
105 m/m of water frs. 430 per hectare		0.31 frs.
220 " " " 656 " "		0.40 "

Generally speaking, irrigation gave a considerable increase in the crops and in the net profit. The advantage of prolonged irrigation was clearly demonstrated in the case of potatoes and oats; in the case of oats early watering was especially profitable. Whether an early start would be better for potatoes also is still to be investigated. The question is not yet settled with regard to the other "hoed" (*sarclé*) crops.

E. GOLTARA. Hydrographical Map of Italy. Irrigation in the Province of Bergamo. (*Carta idrografica d'Italia. Irrigazione della provincia di Bergamo*). Ministero di Agricoltura, Industria e Commercio. Vol. VI-bis, 1910. Rome, Tipografia Nazionale, p. 320 (1).

About 48 280 hectares in the plain of Bergamo are irrigated and about 11 917 hectares remain to be brought under irrigation.

The area which may be considered dry includes all the hill and mountain region and measures about 203 921 hectares. As a rule, a seven years rotation of crops on a dry soil will give a gross return of 140 frs. per hectare, whilst the gross return of the same land when irrigated is about 235 frs.

The best and most extensively irrigated district is the valley of the river Oglio, closely followed by those of the Brembo, Adda, Serio and Cherio. The most extensive irrigated cultivations in the plains of Bergamo are:

1. Maize about 28 000 hectares
2. Permanent grasses and *marcite* (2). " 5 000 "
3. Temporary meadows " 3 000 "
4. Flax " 400 "
5. Rice-fields (on the decrease) . . . " 600 "
6. Melon beds.
7. Marke gardens.

(1) Under the title of "Carta idrografica d'Italia" (Hydrographical map of Italy) the Italian Ministry of Agriculture publishes an important series of volumes, dating from 1888, illustrated by maps, diagrams and tables, containing a complete hydrographical survey of the different regions of Italy.

All questions dealing with Italian rivers and water-courses, from the historical, technical, statistical and economical points of view, are treated. Thirty-four volumes have already been published.

(2) In Lombardy, meadows irrigated during winter by water kept flowing over them are called *marcite*. They are celebrated for their numerous heavy yields. [Ed.]

Italy

When the high level of the lands renders irrigation impossible, the farmers counteract drought by increased manuring and frequent hoeing. This plan is adopted on the very fertile plateau called Isola, between the Brembo and the Adda and the northern mountains. the soil consisting chiefly of deep clay.

The grazing industry is very profitable in the Alpine regions, the soil getting fertilised by the abundant manure produced. Some small part of the Alpine land is watered from natural sources.

In the hill regions where irrigation is not possible, vineyards, mulberry plantations, olive groves, etc., which suffer little from the lack of water, are cultivated in preference to green crops.

The volume giving this information on the agriculture of the province of Bergamo is plentifully supplied with maps and hydrometric data.

Projected Irrigation from the River Tendula, in British India. (Das Tendula-Bewässerungsprojekt in Britisch-Indien) — *Deutsches Kolonialblatt*, Berlin, Nov. 1, 1910.

British
India

The irrigation plans for the Tendula River, in Central India, have been approved by the Secretary of State. Though not attaining the magnitude of the Punjab works. these plans when carried out will be highly beneficial to Indian agriculture.

About 16 000 million cubic feet of water (1 cubic foot = 0.028 315 cub met.) flow yearly in the Tendula and the Lukka, but 9000 million cubic feet would be sufficient for the projected irrigation. The principal canal will be 40 miles long (equal to 64 kilometres). out of a total area of 608 516 acres (equal to 245 840 hectares) more than a third will be irrigated each year. An irrigation tax of 2 rupees (3.20 frs.) per acre will be imposed.

As soon as the works on the Tendula and the Lukka are complete, other irrigation works will be begun for the benefit of the Central Provinces.

ZIMMERMAN. The Nile during the last Fifty Years. — *La Quinzaine Coloniale*. Paris, Oct. 25, 1910.

Egypt

It may be said that we are perhaps only at the beginning of the utilisation of the Nile. Sir W. Willcocks proposes forming a sort of new Lake Moeris by filling the depression of the Wady Rayan, 41 metres below sea-level. The Lake would be 70 metres deep and with the Assouan reservoir would help to supply Egypt with water from March to May.

Great projects are being discussed for the Egyptian Sudan: local dams on the Blue Nile, the Atbara and the Gash, with the object of fertilising the plains to the North of the Abyssinian range, dredging the bed of the

Bahr-el-Giraf, opening a new channel for the river across the swamps, and later on building dams on the Albert Lake. In short, the immense quantities of water descending from the Abyssinian mountains are to be utilised to the fullest possible extent.

Irrigation Investigations in the United States. — *U. S. Dept. of Agric. Annual Report of the Office of Experiment Stations*, 1909, pp. 34-39. Washington, 1910.

Irrigation is developing rapidly in the United States. The following official data are given:

	Acres	Hectares
Area already provided with canals, not yet cultivated	5 670 570	2 295 777
Area in course of irrigation	8 424 026	3 410 537

To this must be added 12 972 000 acres (5 252 000 hectares) which are already irrigated and cultivated, so that, even allowing for possible repetitions in the above figures, the total irrigated area of the United States will shortly be doubled, attaining about 24 700 000 acres (10 millions hectares).

United
States

The net cost is as follows:

Year	Irrigation area		Total cost		Cost per acre	Cost per hectare
	acres	hectares	dollars	francs	dollars	francs
1904 . . .	1 378 576	538 128	27 779 542	138 897 709	20.88	258.18
1905 . . .	1 026 418	415 554	26 767 900	133 839 500	28.08	347.16
1906 . . .	1 260 920	510 494	40 320 816	201 649 079	31.95	395.95
1907 . . .	1 905 950	771 640	72 100 000	360 500 000	37.90	467.28
1908 . . .	2 287 487	926 108	86 964 445	434 822 225	30.41	487.25

These figures represent the average cost; in practice, it varied from 17.69 to 67.04 dollars per acre, 218.75 to 828.75 frs.

The average cost per hectare was 9.04 doll. (111.83 frs.) in 1900, and 9.42 doll. (116.53 frs.) in 1902, showing an increase of 327%.

SCHANDER and WOLFF. **Experiments on the Influence of Tillage and Fertilisers on the Natural Fauna of the Soil.** (Versuche über den Einfluss der Bodenbearbeitung auf natürliche Bodenfauna). — *Mitteilungen des Kaiser Wilhelms Instituts für Landwirtschaft in Bromberg*. B. III, H. 1, p. 51, Berlin.

Germany

The effect of mechanical and chemical treatments (tillage, rolling and manuring) on the fauna of some virgin forest land were studied. Three large plots were first marked out:

- a) manured with potash ;
- b) treated with lime
- c) treated with common salt.

Each plot was laid down :

- $\frac{1}{3}$ with lupins ;
- “ “ potatoes ;
- “ “ oats.

Plots a) and b) were tilled :

- 1. with very deep autumn ploughing ;
- 2. with shallow spring ploughing ;
- 3. with simple superficial ploughing.

Plot c) on the contrary, was tilled :

- 1. with deep autumn ploughing ;
- 2. with simple superficial ploughing.

Each subdivision was further divided in two parts, one of which was rolled and the other not. The first results showed that lupins and potatoes are less strongly attacked by skip-jacks (*Agriotes sp.*) in soil treated with potash. No favourable effect upon them was obtained by the lime dressing, and the effect of common salt was uncertain. Deep ploughing proved ineffectual while shallow ploughing was highly beneficial.

In the case of the oats only the potash treatment was effective against thrips ; because in oats treated with potash the ear grows out of the sheath more rapidly.

The Hungarian Agricultural Experimental Station at Magyaróvár. (Station royale d'expériences agricoles à Magyaróvár). — *Les Institutions Agricoles Hongroises*. Edition du Minist. Royal Hongrois de l'Agric. Budapest, 1910.

Hungary

The Agricultural Experimental Station at Magyaróvár and its branch at Arad have undertaken some practical experiments on the culture and use of new species of plants, and on the employment of manures. The experiments are carried out with the cooperation of farmers.

The Hungarian Central Agricultural Experiment Station Committee at Budapest. — *Les Institutions Agricoles Hongroises*. Edition du Minist. Royal Hongrois de l'Agric. Budapest, 1910.

Hungary

The Central Agricultural Experiment Committee at Budapest (Department of Agriculture) directs the work of the Hungarian Experiment Sta-

tions, and publishes reports in the periodical *Kísérletügyi Közlemények* (Communications on agricultural experiments).

G. VALDER. **Farmers' Experiments in New South Wales, Summer Crop Season 1909-1910.** — *Agricultural Gazette of New South Wales*, October 4, 1910.

Twenty plots of land in the Coastal Districts and sixteen in the Inland Districts were selected for experiments with maize for grain, forage-maize, sorghum, millet and cowpeas (1), for fodder. The following varieties of maize were used: "Yellow Dent" and "Hickory King" for fodder and grain, because they had given the best results last season; "Iowa Silvermine" because it is a quick growing fodder and grain variety, and "Pride of the North" on account of its early ripening for grain. The new varieties imported from the United States include: "Funk's Yellow Dent," "Boone County Special," "Cocke's Prolific" and "Marlbro' Prolific;" from Victoria, "Long-fellow," "Early Yellow Dent," "Sibley" and "Early Leaming."

The "Yellow Dent" is the best all-round variety yet obtained and is to be used as a standard for testing the new Victorian and American varieties. Its ears are large, grain long and narrow, with small core, and the fodder of excellent quality.

The "Hickory King" gave inferior results both in grain and fodder.

The "Iowa Silvermine" was the best early variety, both for grain and fodder.

The "Pride of the North" came next to "Iowa Silvermine" for early grain but was far inferior to it as fodder.

The results of manure on rich soils such as those of Pambula, Tumut and Grafton, were economically unsatisfactory, but on the poorer soils of Myrtle Creek, Moss Vale, etc., manuring gave the remarkable yield of 10 bushels of grain and 2 to 3 tons of green fodder per acre. The increase of production was 16 $\frac{1}{2}$ cwt. of green fodder and 3 bushels of grain per acre, at a cost of 10s. for manure.

Of the varieties obtained from the U. S. Department of Agriculture, "Funk's Yellow Dent" and "Boone County Special" proved good grain varieties, while "Cocke's Prolific" and "Marlbro' Prolific" were particularly good for fodder and ensilage.

Common-
wealth
of
Australia:
New
South
Wales

(1) Cowpea (*Vigna Catjang*, Walp. and *V. Sinensis* Endl.). The cowpea is a leguminous plant comprising about thirty species allied to *Dolichos* and *Phaseolus* (the common bean). The nomenclature of the cultivated varieties of the cow-pea is very confused. It is known in the South of the United States as Black-Eyed Pea and Cornfield Pea. It is grown for hay and green manure, and also furnishes a bean which has for a long time past been used for human consumption.

See H. Bailey, *Cyclop. of Amer. Hort.*, vol. IV, p. 1931. [Ed.]

Among the sorghums, the "Planter's Friend," *Sorghum Saccharatum*, and "Early Amber Cane," already grown in New S. Wales, have proved to be better than any of the newly imported varieties of sorghum. New experiments have again shown the "Planter's Friend" to be the best all-round variety known. The "Early Amber Cane" is a quicker grower and of excellent quality, and therefore a good variety for early feed. The *Sorghum Saccharatum* was not quite equal to the other two.

The sowing of sorghum and cowpeas together did not give such good results as a mixture of cow pea and maize.

Trials were made with the following varieties of cowpeas. "Black," "White," "Clay-coloured," "New Era" and "Whip-poor-will;" "Black" and "Clay-coloured" gave the heaviest crops, also when sown with maize or sorghum.

The ensilage experiments gave excellent results, and greatly contributed to recommend the system.

H. L. GALLWEY. **Nitro-bacterine Experiments at St Helena.** (Agriculture, Forests and Gardens). — *Colonial Reports*, Annual, n. 638, p. 11, St. Helena. London, 1910.

Experiments in St. Helena with nitro-bacterine, on poor soils sown with oats, gave very satisfactory results, the crop reaching a height of $4\frac{1}{2}$ feet, having never been higher than from 9 to 12 inches previously, and yielding an excellent fodder and plentiful grain.

The cost is not more than 5 s. per acre (about 15 frs. p. ha.); a great advantage over heavy manures where communications are defective and transport costly.

Influence of Molasses on Soil Fertility. — *The Agricultural News*, vol. IX, n. 222, p. 339, Barbados, Oct. 29, 1910.

An article by Mr. W. P. Ebbels on the fertilising effect of molasses on sugar cane soils, led to some experiments being carried out by the Agricultural Department in Antigua. The first results are given in the Report on Sugar Cane Experiments in the Leeward Islands, and in Pamphlet 64 of the Department Series; and the experiments are being continued.

It appears that the good effects of the molasses are still observable after the third ratoons in cases where the molasses had been applied to the land before planting. In one such case the third ratoon yielded 12 tons more of cane per hectare than land untreated with molasses. These results are confirmed by M. P. Boname, Director of the Station Agronomique, Mauritius.

The effect of molasses is better than that of other manures containing

Saint
Helena

Leeward
Isles:
Antigua

the same quantities of nitrogen, phosphorus and potash in a different form; this may be due to its action in developing certain soil bacteria.

The quantity employed is about 74 hectolitres per hectare.

Dr. J. KÖNIG. **The New Synthetic Nitrogen Fertilisers.** (Ueber Norgesalpeter, Kalkstickstoff und Stickstoffkalk).—*Zeitschrift der Landw. Kammer Herz. Braunschweig*, Braunschweig, No. 11 and 18, 1910.

This article deals with the present state of production of nitrate of lime, calcium cyanamide, and nitrogenous lime (*Stickstoffkalk*) in relation to other sources of nitrogenous fertilisers. After a brief outline of the investigations made, for determining the fertilising value of the three new nitrogen compounds, their behaviour in the soil and action on its bacteriological flora, the writer comes to the following conclusions:

Germany

1) As calcium cyanamide absorbs moisture and carbon dioxide from the air, with loss of nitrogen, even when kept in a dry place, it is not advisable to store it for any length of time.

2) Calcium cyanamide has a disagreeable smell. It produces much fine dust when handled, and can therefore only be applied to the soil by manure drills or by mixing it with slightly moistened mould and spreading it by hand. (It has recently been so prepared as to avoid this drawback).

3) Calcium cyanamide may be mixed with salts of potash as well as with Thomas slag, or with both together. But it should never be mixed with superphosphates.

4) Calcium cyanamide should not be used on sour organic soils, as peat soils, or those deficient in lime and with a tendency to sourness, nor for poor, sandy soils. It is not suitable for summer top dressings, being used in top dressings at most only for winter crops and for permanent pastures. The fertiliser must be spread not later than February.

5) Calcium cyanamide may be advantageously used for all other soils, especially for light clays, containing a sufficient quantity of lime, and regularly manured with stable manure, provided the following rules be observed:

a) It should be applied from 8 to 15 days before sowing;

b) The quantity must not exceed 300 kg. to the hectare (= 60 kg. of nitrogen per hectare);

c) It should be ploughed in deeply, so as to well mix the fertiliser with the soil;

d) It must not be used on moist soils, or on those heated by the sun, which would cause loss of nitrogen.

If used with these precautions, calcium cyanamide may advantageously replace sodium nitrate and ammonia salts for all kinds of crops.

The production of these artificial fertilisers derived from atmospheric nitrogen removes all fear of any deficiency in the supply of nitrogenous fertilisers arising from the exhaustion of the Chili nitrate deposits. Moreover their use will prevent an immoderate rise in the price of nitrogenous fertilisers, which till quite recently have been an absolute monopoly. Indeed, their price has already diminished of late years, although the consumption is much greater than before. It is in the general interest of agriculture that the new industries connected with the utilisation of atmospheric nitrogen should be successful.

P. HANNSCH. **Calcium Cyanamide as a Fertiliser.** (Kalkstickstoff). — *Land- und Volkswirtschaftl. Mitteilungen*, Linz. Nov. 1910, No. 22, pp. 242-243.

Austria

This article deals with the decomposition of calcium cyanamide in the soil, and its effects in different cases. In peat soils, rich in humus, in damp meadows, and generally in all soils which, being deficient in lime, are of an acid nature, calcium cyanamide does not give good results. Where its use is advisable, the quantity should not exceed the proportion of 150 to 300 kg. per hectare.

Excessive dressings with calcium cyanamide prevent its transformation into nitrates by the bacteria of the soil.

Calcium cyanamide should be well mixed with the soil, and never used when the soil is warm or damp, and never as a top dressing.

ESME HOWARD. **Hungarian State Monopoly Bill for Nitrate of Potash.** — *The Board of Trade Journal*, London, Nov. 5, 1910, p. 232.

Hungary

A Bill was passed by the Hungarian House of Representatives on October 5th, making the production of nitrate of potash a State monopoly.

LEVAT. **Process for Enriching Natural Phosphates.** (Brevet français du 8 mars 1910). — *L'Engrais*, Lille, Nov. 1910, No. 45, p. 1252.

France

The carbonates of lime contained in the phosphates are transformed into calcium chloride by means of ammonium chloride; the calcium chloride is leached out and the ammonium chloride regenerated.

BARDY. **Improvement in the Process of Enriching Phosphates of Lime.** (Brevet français du 17 Juin 1909). — *L'Engrais*, Lille, November 1910, No. 45, p. 1252.

France

The phosphatic chalks, containing 60-70% of carbonate of lime, are burned so as to decompose the carbonates. The lime is then dissolved away

by a 10 or 12 % solution of sugar. The sucrate of lime thus formed is then decomposed to regenerate the sugar.

E. VOGLINO. **The Pyrophosphates, New Phosphatic Fertilisers in the Cultivation of Sugar Beets.** (Nuovi concimi fosfatici nella coltivazione delle bietole zuccherine). — *Il Coltivatore*, Casal Monferrato, 6th year, No. 30, Oct. 30, 1910, p. 370-372.

Experiments have been made at Alexandria, in Piedmont, with two new fertilisers, prepared by a Firm at Vercelli: *Simple Pyrophosphate* and *Acid Pyrophosphate*, the first containing 17 % and the second 19 % of phosphoric pentoxide, soluble in dilute citric acid.

The experiments were made to form a comparison with mineral superphosphates, and with a plot cultivated without any phosphatic manure. The results showed:

Italy

1) That simple pyrophosphate has an action slightly inferior to that of mineral superphosphate, containing an equal quantity of phosphoric pentoxide;

2) That acid pyrophosphate increases production when compared with mineral superphosphates, containing an equal quantity of phosphoric pentoxide;

3) That there is no difference in the percentage of sugar contained in the beets, when manured with superphosphates or with pyrophosphates.

Phosphate Rock. — *Journal of the Royal Society of Arts*, London, November 4, 1910.

The demand for mineral phosphates in the chemical manure industry is continually increasing.

The total annual output of mineral phosphates is now about 5 million tons, America being in the first rank of producers with 2 million tons. Tunis produces, about 907 000 tons, the Pleasant Islands 250 000 tons. There are deposits estimated at about 10 million tons in the Makaten Islands of the Archipelago of Tuamotu, which will be worked for many years to come.

World
Production

HENRY BARTMANN. **Manganese as a Fertiliser.** — *Journal d'Agriculture pratique*, No. 47, Paris, November 24, 1910, pp. 666-667.

The action of a manganese fertiliser has been tried in the Experimental field at Rueil (Seine and Oise) on a light silico-calcareous, sandy soil, poor in fertilising elements.

France:
Seine et Oise

The experiments were made:

1) on the comparative action of the different salts and products of manganese;

2) on the action of increasing doses of manganose and manganese lime, the two new manganese fertilisers. (Manganose is a 15 per cent carbonate of manganese, and the manganese lime also contains 15 per cent of manganese in the form of sub-oxides).

In the first experiment the fertilisers tried were: manganese dioxide, chloride, sulphate, manganese lime and manganose, and finally simple lime, in order to observe the action of the manganese in the manganese lime. The experimental plots measured 2.50 m. by 2 metres, and the fertilisers were used in proportions corresponding to 300 gr. of manganose per *are* (1). The plants experimented upon were turnips, peas and beans. The crops showed little evidence of the action of the three salts, manganese dioxide, manganese chloride and manganese sulphate; but the carbonate and the sub-oxides had a marked beneficial influence on the early development and size of the produce.

Potatoes, maize and beets on plots of 50 square metres were used for the experiments on the action of increased doses of manganose and of manganese lime in proportions of 200, 400 and 600 kg. per hectare.

These experiments showed:

1) that the most suitable quantity of manganose and manganese lime is between 200 and 400 kg. to the hectare; beyond 400 kg. the effect is insignificant and even injurious;

2) manganose and manganese lime have practically the same effect, the difference in their action being due to the amount of lime in the soil, the manganese lime having most effect on soils poor in lime.

The manganese fertilisers hasten germination and undoubtedly improve the quality of the crops.

BOURDIOL-HUMBERT. **Defects in Australian and American Dry Farming Methods for the Arid Regions of Algeria and Tunis.** — *Progrès agricole et viticole*, No. 48, Montpellier, Nov. 27, 1910, pp. 658-662.

Algeria.
Tunis

The greatest drawbacks for agriculture presented by the climate of Algeria and Tunis are:

- 1) Persistent drought during certain winters and springs;
- 2) A too rainy winter followed by an excessively damp spring;
- 3) Early siroccos, or strong West winds, in April and May.

The writer considers it a mistake to adopt in Algeria and Tunis the dry farming methods which are used with advantage in the United States

(1) 1 are = 100 square metres = 119.6 square yards = 0.0247 acres [Ed.].

and in Australia, in the so-called semi-arid regions. There are great differences in climate, especially in the rainfall, and in the nature of the soil, between Algeria and the arid regions of the Western States of the United States and Australia. It is therefore necessary to adopt special methods peculiarly adapted to each country. The writer suggests a method of farming for Algeria and Tunis based on the following principles:

- 1) Aeration and *frequent breaking up* of the surface of the soil;
- 2) Successive storing of rainwater in the soil;
- 3) Almost complete suppression of soil evaporation;
- 4) The direction and width of the drill furrows and their distance

from each other to be determined by the nature of the soil and according to the climate.

The American and Australian methods of dry farming aim only at retaining moisture in the soil *until the time of sowing*. Whereas in Algeria and Tunis, soil evaporation except by transpiration through the crops should be prevented, and the only *economical and advantageous* method of attaining this result is repeated breaking up of the surface after each fall of rain and during the whole period of vegetation.

This method has given remarkable results with cereals.

Algeria and Tunis may be divided into three agricultural areas:

- 1) The low coast districts, subject to irregular rain and early siroccos;
- 2) Districts lying between 600 and 800 metres above sea level, subject to regular rains;
- 3) High table lands or plateaux between 900 and 1200 metres, where the rains are very irregular, South winds are frequent and the temperature is liable to sudden and considerable changes.

The usual preparatory tillage is in general sufficient for the second region, but in the coast-region, superficial breaking of the soil must follow preparatory tillage *throughout the whole period of vegetation*. In the third region preparatory tillage is useless, and economical superficial hoeing must be repeated *after each shower, all the year round, both on bare soils and on soils with growing crops*, in order that the almost complete suppression of evaporation may be insured.

The advantages of this superficial culture for cereals in seed-rows set widely apart are: that large and small farms can be easily cultivated in this way, and an uninterrupted succession of good crops obtained even without the use of manures; only a hoe or a cultivator, drawn by a good horse, are wanted; the rain gets safely stored in the soil as soon as it falls; weeds are completely stamped out. Heavier crops can thus be had in Algeria than have hitherto been produced, while in most soils cultivation with the plough can be entirely dispensed with.

Hungarian Stations for Seed Control. — *Les Institutions Agricoles Hongroises*,
Edition du Minist. Royal Hongr. de l'Agric. Budapest, 1910.

Hungary

In Hungary all the seed testing stations have official authority for applying the law against the adulteration of seeds, of farm products and of substances required in agriculture. There is a special tariff for the Station work, but in the case of seed tests made for farmers as to identity, purity, germination and freedom from dodder (*cuscuta*), there is no charge.

Cleaned and pure clover seeds are supplied with a certificate of their freedom from dodder. Hay and fodders are examined from the botanical point of view, and weeds and their seeds are determined and methods of control indicated.

H. SCHROEDER. Resistance of Wheat and Barley Seeds to various Poisons with Regard to Seed-disinfection. (Die Widerstandsfähigkeit des Weizen und Gerstenkorns gegen Gifte und ihre Bedeutung für die Sterilisation). — *Centralblatt für Bacteriologie, Parasitenkunde und Infektionskrankheiten*, 28 Bd. n. 16119, pp. 492-505. Jena, Nov. 15, 1910.

Germany

The sterilisation of vegetable tissues is rendered difficult by the damage caused by the antiseptics to the living organs of the plant. Cereal grains, on the other hand, are generally enclosed in membranes that are impervious to silver nitrate, to copper sulphate, to sodium fluoride and to barium chloride solutions, although pervious to iodine, to corrosive sublimate, to ether, to chloroform and to acetic acid. A 0.2 to 0.7% solution of corrosive sublimate destroys the germinative power of the seeds in 18 hours, whilst a 24 hours' contact with a 6 % solution of nitrate of silver is harmless.

The protection offered by the membrane surrounding the seeds is not limited only to aqueous solutions, but it extends also to anhydrous poisons, alcohol, ether, etc., as appears from the following experiments with whole or partly decorticated grains.

The following table gives the percentage of the seeds capable of germination after treatment with the chemical agents during a certain number of hours (1):

(1) The results of these experiments on the vitality of seeds subjected to chemical reagents, regard seeds not completely dry.

PERCENTAGES OF GERMINATING SEEDS.

Duration of the treatment, in hours.	Control	Ether			Alcohol			Chloroform		
		24	48	144	24	48	144	24	48	144
Whole grains	95	95	84	79	55	65	65	70	65	63.5
Decorticated moist grains	100	87	93	58	47	73	47	73	66	92
Grains decorticated when dry, near the embryo	100	90	45	0	0	0	0	0	0	0

The spores of a large number of bacteria act in a similar manner with regard to the chemical reagents, which naturally makes sterilisation very difficult.

Sterilisation is only possible when there are quantitative differences which permit of the alteration of the spore membranes and the consecutive toxic action of the antiseptics on the bacteria and their spores before the antiseptics have time to damage the protective membrane of the grains.

Satisfactory results have been obtained with silver nitrate, which, in a 4% solution, killed in one hour the spores of *B. Anthracis* without affecting the germinative power of the seeds.

The advantages of this system of sterilisation may be summed up as follows:

1) there is a sufficient margin between the killing of the spores and the destruction of the germinative power of the grains on which the spores are resting;

2) the silver nitrate used as an antiseptic may easily be rendered harmless by a solution of sodium chloride;

3) during the process of disinfection, the seeds swell, and on their smoothed surface the silver nitrate comes promptly into contact with the spores adhering externally to the seed (1).

(1) Seeds may be remarkably resistant to chemical agents when dry and when their enveloping membranes are intact, and when the antiseptics, such as alcohol, are as far as possible deprived of water. But when the seeds have been swollen in water, or when the chemical agents are in aqueous solution, or when the outer membranes of the seeds have been punctured or bruised, the toxic action of the antiseptic soon destroys the vitality of the seed.

See ITALO GIGLIOLI, *Resistenza dei semi, specialmente dei semi di medica, all'azione prolungata di agenti chimici gasosi e liquidi*. « Gazzetta Chimica italiana », vol. IX, 1879, pag. 474. [Ed.].

Disinfection of Maize Seed. — *The Agricultural News*, vol. IX, No. 222. Barbados, p. 350, Oct. 29, 1910.

It has been considered advisable to disinfect the seed of maize at Antigua in consequence of the frequency of disease in the roots of maize and of isolated cases of smut.

Experiments have been made at the laboratory of the Department of Agriculture to ascertain whether solutions of corrosive sublimate damage the seeds. Of six lots of seed, the first was steeped in the solution for 40 minutes, the second for 25 and the third for 20; the other three were not treated at all. They were all placed in the germinating chamber, and within five days had germinated in the following proportion:

	Seeds treated. Germination per cent.	Seeds not treated. Germination per cent.
Lot I	97	74
» II	99	73
» III	95	82

and at the end of 13 days:

Lot I	98	81
» II	99	86
» III	98	87

This proves not only that corrosive sublimate is not harmful to the Maize seed, but seems rather to favour germination.

In these experiments the seeds that had not been treated were sown dry, but other experiments were made in which the seeds not treated were steeped in distilled water for 20 minutes and the others for the same period in a 1‰ solution of corrosive sublimate.

The percentage of germination was as follows, at the end of two days:

	Treated seeds, per cent	Untreated seeds, per cent
Lot I	82	52
» II	76	27
» III	70	83

At the end of the next three days:

Lot I	99	83
» II	98	60
» III	99	69

The seeds treated with water only, continued to germinate for 18 days more, when the following were found to have germinated out of 300 seeds:

	Untreated seeds per cent
Lot I	98
» II	96
» III	96

These figures show that treatment with dilute corrosive sublimate solution increases the percentage of germination, diminishes the chances of infection with fungoid diseases, acts as a stimulus to germination, and produces plants of more regular development from having germinated at the same time.

Mr. C. J. Simmons, of St. Vincent, informed the Department of Agriculture that this treatment of maize seeds is practised on several estates in that island, with satisfactory results. It is taking the place of the old system of immersion in salt water.

G. MARTINET. **The Advantages of Selection of Native Wheat in the Canton of Vaud, Switzerland.** (Blés indigènes sélectionnés et blés étrangers). — *La Terre Vaudoise*, 2nd year, No. 49, 1910, pp. 516-517. Lausanne.

"The Federal Seed Station at Lausanne sent several samples of Swiss native selected wheat in 1909 to Mr. Alfred Jordan of Carrouge, an expert in wheat selection, in order that he might cultivate them on a large scale. The comparative experiments were carried out at Jorat, at an altitude of about 729 metres (2400 feet) above sea-level. The weather prevented the sowing of the wheat until December 4th, an extremely late date, especially at the altitude of the Jorat. Some improved wheats of Vilmorin were sown in the same field a *month earlier* under the same conditions as³ to soil and manure. Notwithstanding the late sowing, the native selected wheats grew strong and well, and were not affected by the severe winter nor by the excessive moisture of the whole season.

Switzerland:
Vaud

"The following were the average comparative yields per hectare:

	Grain	Straw
Average of 11 native wheats	kg. 2217	5722 kg.
Average of 6 Vilmorin wheats »	1242	3370 »

"If the average yield of the native Swiss wheats be estimated at 100, the yield for the foreign wheats is 56 for grain and 59 for straw.

"The largest yield of a Vaudois native wheat in ordinary conditions was 3190 kg. of grain and 6800 kg. of straw, while the smallest yield of Noé Vilmorin wheat was 365 kg. of grain and 2000 kg. of straw. The best foreign wheat, the *Bordier*, which yielded 1870 kg. of grain and 3600 kg. of straw, is therefore considerably below the average of the improved native wheats of Vaud.

"These experiments once more confirm the superiority of native over foreign wheats, when the former have been improved by selection."

Ear Characters of Seed Maize in Relation to Yield. — *U. S. Depart. of Agr. Farmers' Bull.* 419; *Experiment Station Work*, LIX, pp. 10-15, Washington, October 8, 1910.

A series of minute observations made at the Ohio Experiment Station have led to the formation of some rules which may help farmers to improve maize on their own farms, and widen the field of agricultural experiments.

United
States:
Ohio

The long-eared maize yields from 3 to 5 bushels more per acre than the short eared varieties; and the greater the difference between the ears of the same variety, the greater the increase in yield. A prolonged selection, however, tending to the maximum length of ear, never gives a heavier yield than that corresponding to the average length.

Maize having tapering ears yields a little more (about 0.86 bushel per acre) than the cylindrical-eared maize. Seeds from an ear with a bare tip give good results the first year, but the number of bare ears increases and the yield grows less every year if this process of selection is continued.

There is a close relation between the productiveness of a variety of maize and the total weight of the ear.

The value of germination experiments is very relative; they never give an index of hereditary qualities. In the choice of the best plants, those whose vigour is due to special surroundings (such as more abundant manure, favourable exposure to light, etc.), should be avoided.

It is not possible to express an opinion as to the value of imported varieties until these have had time to become acclimatised and an equilibrium between the plant and its new environment be established.

Field-crops. — Industrial Crops. — Horticulture. — Arboriculture.

QUANTE. **Investigations on the Variation of Cereals.** (Variationstatistische Untersuchungen über den Bau der Getreidearten unter Zugrundelegung der Kollektivmasslehre).—*Landw. Versuchs-Stationen*, Berlin, Band LXXIV, Heft. I-II, pp. 121-162.

Germany

If a certain number of individuals of the same cereal breeds be observed, it will be seen that they do not all present in the same degree the characteristic racial marks. Measure, for instance, the length of straw of *Square*

head wheats and represent the lengths by a series of ordinates: the middle point of the curve does not coincide with the point corresponding to the arithmetical mean of the numerical values, but occurs sometimes on the right and sometimes on the left of it.

According to Gauss, the reason of this is that natural forces acting as couples are so nearly balanced one against another as in most cases to produce equilibrium, but occasionally one force becoming dominant causes a deviation from the average type. Dr. Quante expresses the Gauss theory by the following algebraical formula:

$$r = \frac{\pm \delta}{\sqrt{n \cdot (n - 1)}} \cdot 0.845$$

which allows the probable error r of an isolated observation to be estimated. In this formula, $\pm \delta$ represents the sum of the deviations in relation to the average of the different observations; n represents the number of the observations, and 0.845 is a constant factor obtained by calculation.

Dr. Quante has tested and adopted this formula in a large number of observations on the length of stems and the weight of grain in wheat, barley and rye, and summarises thus his results:

1) To qualify exactly the measurable characters of a cereal the knowledge of average values given by the examination of a series of individuals of a species, sub-species, etc., is insufficient. On account of the assymmetrical individual deviations (demonstrated by Dr. Quante) in relation to the average value, the series (*Verteilungsreihe*) to which they correspond must also be established, and its most frequent, (*dichteste*) and therefore most probable, value, be calculated.

2) When selection for a given quality has been rigorously made, deviations become symmetrical, thus giving the means of determining the precision of the selection made.

Cleaning Grain. (Amme, Giesecke u. Konegen Aktiengesellschaft, 407, 122 September 10, 1909). — *La Meunerie française*, Paris, Nov. 1910. No. 302, pp. 260-261.

Germany

This new process consists in adding to the water in which the cereals are washed an alkali, or a salt which acts as an alkali (soda, lime, etc.). This removes the impurities from the grain by dissolving the fatty matter of the husk and germ to which the impurities adhere.

The water used may be hot or cold, and the alkali or similar substance added beforehand, or at the same time as the grains, or it may be previously mixed with the grains. The subsequent manipulations (drying by hot air, where indicated, etc.) are carried out in the usual manner.

Instead of washing by immersion, the grains may be simply moistened and then cleansed of the impurities thus detached by means of friction.

HITTER. Inquiry into the Cause of the Deficit in the Wheat Crop in France in 1910. The most Successful Varieties. (Etude des causes du déficit de la récolte du blé en France en 1910. Les variétés qui ont le mieux réussi). — *Notes d'agriculture. Bull. de la Soc. d'Encour. pour l'Industrie Nat.* T. 113, No 8, pp. 297-304. Paris, 1910.

The year 1909-1910 was one of the worst, for wheat production, which has been known in France for 50 years.

France

Excess of humidity in the soil was the more or less direct cause of the poor wheat harvest. On very permeable chalky soils, or even on thin clay with a sandy or limestone subsoil, the wheat grew fairly well, and where the crops were clean and well manured the harvest was good. But on more or less heavy clay soils the damp was so great that much of the wheat rotted, while cryptogamic diseases were rife every where. *Straw Blight* made terrible havoc by weakening the stems, so that the wheat was laid very early. Many of the soils were so hardened and beaten down by the rain, that the principal roots of the wheat which spring from the crown, and on which the life of the plant chiefly depends, developed either very feebly, or not at all.

In 1909-10 the varieties of wheat which succeeded best were early ripening kinds, among which were *Hybride du Bon Fermier*, *Trésor*, *Dattel*, etc. French wheats, which were hardy and ripened well, were and are still sought after by millers, but the weakness of the straw, which frequently causes it to be laid, and the small yields, have caused foreign varieties to be preferred. Among these, English wheats had a long popularity, but the hybrid varieties of M. de Vilmorin, which seem suited to the soil and climate of France, have taken their place. These hybrids are *Bon Fermier*, *Trésor*, *Dattel*, *Massy*, *Bordier*, *Hybride inversable*, etc.

Possibilities of Wheat Production in Manchuria. — *The Board of Trade Journal*, London, Nov. 3, 1910, p. 218.

China:
Mand-
churia

The present annual production of wheat in Manchuria is about 10 million bushels, notwithstanding the primitive methods of cultivation. The soil and climate are as favourable for wheat production as those of the Mississippi valley, but millet, sorghum and maize have been hitherto preferred as food by the inhabitants, and wheat has not been extensively cultivated. The demand has been increasing lately, and mills have been set up at Harbin, Changchun, Hailin and Shuangchengpu. Wheat culture is now likely to develop considerably in China.

KRÜGER. **New Experiments with Rye and Barley.** (Winterroggen und Sommergerste nach verschiedener Anbaumethode). — *Mitteilung des Kaiser Wilhelms Institutes für Landwirtschaft in Bromberg*, Bd. III, H. I, Germany pp. 21-22, Berlin.

The following interesting results are given of a series of experiments in the cultivation of winter rye and summer barley (*Hanna*) according to the Demtschinsky method. There were four series of cultivations:

- 1) 120 kg. of seeds per hectare, sown in furrows 15 cm. apart;
- 2) Transplantation and earthing up;
- 3) Seeds sown in furrows according to the Demtschinsky method, 60 kg. per hectare, with successive earthing up;
- 4) Same as No. 3, but hoed to keep the plants apart.

The grain yield was as follows:

Method of cultivation	Rye	Barley
1	Quintals 33.4 per hec.	Quintals 31.6 per hec.
2	» 21.6 »	» 3.7 (?) »
3	» 35.3 »	» 39.6 »
4	» 23.7 »	» 31.7 »

The cost of earthing up was scarcely covered in the case of rye by the increased crop of 2 quintals par hectare, whereas the 8 quintals increase in the case of barley make the method profitable.

K. ZISELSBERGER. **Composition of this Year's Barley.** (Die neuen Gersten). — (*Zeitschrift f. ges. Brauwesen*, 33, 473-75); *Chemisches Centralblatt*, 81 J., II, p. 1511, Berlin, Nov. 9, 1910.

The following are some interesting data from the analyses of 25 qualities of this year's barley: Germany

	Weight of 100 grains	Albuminoids	Non nitrogenous Extract
Bavarian barley . . .	44.6 gr.	12.9 %	75.05 %
Bohemian barley . . .	44.8 »	10.9 »	77.35 »
Moravian barley . . .	44.2 »	11.7 »	76.3
Slovak barley . . .	38.8 »	11.5 »	75.6 »
Hungarian barley. . .	37.3 »	12.5 »	74.4

AUBERT. **The Cultivation of "Andropogon" Sorghum in Burma.** (Andropogon Sorghum "Pyannng"). — *The Tropical Agriculturist*, Colombo, Oct. 1910.

Sorghum, *Pyannng*, (*Andropogon sorghum*) (1) is, the main source of

British
India:
Burma

(1) *Andropogon sorghum* is more often spoken of as *Sorghum vulgare* Pers. In 1905-1906, it was grown on an area of 24 000 000 acres (between 9 and 10 million hectares) in British India.

See: SIR GEORGE WATT, *The Commercial Products of India*, London, 1908, pp. 1031; *A Dictionary of the Economic Products of India*, London, 1893. [Ed.].

food for men and animals in the dry region of Upper Burma, especially in the districts of Tegaing, Shwebo, Meiktila, Magwe, Minbu, etc.: where it is to the population what rice is to the inhabitants of the southern provinces. *Pyang* also grows in some parts outside this region. About 2000 square miles are cultivated yearly in Burma with this variety of sorghum which forms the chief food of 2 250 000 men and 1 000 000 cattle.

The principal varieties of sorghum are: *Andropogon sorghum*, *Sorghum saccharatum*, or Chinese sorghum, *Sorghum nigrum* and *Sorghum halepense*. Sorghum is much damaged by the weeds *Convolvulus arvensis* and *Striga lutea*, the growers being quite unable to cope with either of them.

Besides the thousands of birds which ruin the flower and the ripe crops, there is a snake, *Russell's Orper*, which twines round the stem of the plant and breaks it in trying to reach the flowers and grains. The *Pyang* is also ravaged by a fungus, which lives as a parasite in the flowers.

RABINO-LAFONT. **Rice Cultivation in Guilan, Persia.** — *Annales de l'Ecole Nationale d'Agriculture de Montpellier*, Oct. 1910.

Rice is cultivated in nearly every province in Persia, but the greatest quantities are produced in Guilan where the average production is 180 million kg., 128 millions of which are consumed by the inhabitants of the province.

Persia The varieties at present cultivated are: *Rasmi*, *Sadri*, *Moulai*, *Amberbou*, and *Tchumpai*, in all of which the unhusked grain is white. The *Rasmi* of which there are 22 sub-varieties has a very large grain. The most esteemed variety is the *Sadri*, which has a particularly fine and well-shaped grain. There is no distinction made as a rule between the *Sadri* and the *Moulai*, although the latter has a hooked point. The *Amberbou* is one of the oldest varieties cultivated in Guilan, but it is now less grown in Mawazi, where the *Moulai* is preferred. The *Tchampa* is cultivated more than the *Rasmi* on account of its higher yield, the grain being heavier. The villages of Foumen use it exclusively, because it is the cheapest rice.

In Mawazi the plant called *chounde* (*Sambucus Ebulus*), which grows plentifully there, is much used for green-manuring rice-fields, but generally speaking, the rice plantations are not sufficiently manured in these regions.

The seeds are always sown in nurseries, called *Toumbedjar*, and placed beside a canal, failing which, a well is dug. When the young plants are 8 or 9 cm. high, they are transplanted into the rice-field in rows. They are hoed twice. After the second hoeing the cultivation of the rice consists chiefly in watering. When the growth tends to become too luxuriant in very rich soils, the rice is mown in order to force the production of the ear.

Rice Culture in the Karikal Settlement. — *Agriculture pratique des Pays chauds*, Paris, Oct. 1910, n. 91.

A description is given of the primitive methods of cultivating rice at Karikal, in French India, near the mouth of the Arselar, one of the branches of the river Cavery, on a soil watered by eight rivers and five large canals. There is an area of 3500 *vels* (9364 hectares), of which 1337 hectares are cultivated for double and the rest for single crops.

In May, June and July, when the Cavery rises, all the lands to be used for rice cultivation are flooded, and the water turned off as soon as the ground is well soaked and softened. The prepared soil is then tilled, the water turned on again, and the seeds sown broadcast on the water, which should be 5 cm. deep. Before sowing, the *Nelly* (1) is steeped for twenty four hours and has already begun to germinate. The water is drawn off the rice field two or three days after the seeds have been sown, and the soil is again flooded by degrees as the plant grows. Thirty or forty days later the *nelly*, tied in sheaves, is moved to a neighbouring field, where it is replanted in little groups of from 5 to 10 plants each; the watering is frequently renewed until the harvest, three to six months later, according to the quality of the *nelly*. The *Courouvé* variety of *nelly* is gathered nine or ten weeks after transplantation, while the *Chamba* is not ready for six full months from the day the seeds were sown.

French
India:
Karikal

Ammonium Sulphate as a Fertiliser for Rice. — *The Agric. News*, Oct. 15, 1910.

A report on methods of rice and cotton cultivation in China and Japan is published in the *Hawaiian Forester and Agriculturist* of July, 1910. Attention is drawn to the fact that, after centuries of continuous crops, the fertility of the Japanese rice fields increases every year, especially as regards soil-content in nitrogen, while in Hawaii the rice harvests and the nitrogen in the soil are diminishing year by year. The Japanese system of cultivation, which mainly consists in abundant fertilising with stable manure and special rotations with alternate crops, is therefore recommended.

China.
Japan.
Hawai

Experiments made in Japan with ammonium sulphate have given a considerable increase of yield, but have shown that its continued use causes undesirable variations in the physical condition of the soil. Sodium nitrate does not give such rapid or effective results as ammonium sulphate, and experiments have shown that, under existing conditions, only a small part

(1) *Nelly* or *Nellie* is one of the many synonyms used in India for the different varieties of cultivated rice (sathi, garri, tandula dangar, Akki, etc.).

See Sir GEORGE WATT, *The Commercial Products of India*, 1908, p. 824. [Ed.].

of the nitric nitrogen is really assimilated by the rice plants. Their direct assimilation of ammoniacal nitrogen is a fact of considerable interest, and confirms the conclusions recently reached by Hutchinson and Miller at the Rothamsted Experiment Station on the absorption of salts of ammonia by plants.

KNAPP. Rice Varieties in the United States. — *Farmers' Bulletin*, 417, Washington.

United
States

The two chief varieties of rice cultivated in the low lands of the Atlantic States are *Gold Seed* and *White Rice*. *Gold Seed* is gaining ground over *White Rice* along the coast, on account of its quality and high production. *Gold Seed* has two types of seed, small and large; the *White Rice* has the advantage of being an early variety.

In Louisiana preference is given to the Honduras variety, which is brought direct from Honduras. The rice imported from Japan gives excellent results, and the straw keeps green even after the grain is ripe. Of all the Japanese varieties the *Kiusku* yields the finest crops.

Experiments with *Upland Rice* in the United States have given unsatisfactory results, although it does well in India, China and Japan.

(O. MUNERATI. **Observations on the Wild Beet (*Beta Maritima* L.)** (1). (Osservazioni sulla bietola selvaggia, *Beta Maritima* L.). — *Stazioni Sperimentali Agrarie Italiane*, Modena, 1910, Vol. XLIII, Fasc. VII, IX, pp. 577-584.

Italy

The *Beta Maritima*, unlike the cultivated beet, flowers as a rule the same year that it is sown; it cannot be considered an annual, because it renews its growth in the 2nd, 3rd, and 4th year, or even later. Dr. Munerati, in Polesine, in the Venetian Provinces, found very large and woody roots which must have been eight or ten years old at least, and the predominant form was tap-rooted and more or less branched.

Analyses by Dr. G. Mezzadrolì show that towards the end of August the juice of the roots contains 10, 13 and even 14% of sugar, but not all saccharose. The data of analyses of roots gathered in the second half of October are here given.

	Large Beets	Medium Beets	Small Beets
Water.	91.2°	89.9°	90.4°
Dry matter.	8.8	10.1	9.6
Sugar (polarimetric observ.) . . .	6.0	7.2	7.2
Coefficient of purity	68.01	71.2	73.0
Ash of the central part	3.1	3.0 }	3.3°
Ash of the outer part	4.9	5.5 }	

(1) *Beta maritima* L. = *B. Vulgaris* L., according to the *Index Kewensis*. [*Ed.*]

H. JUMELLE. **Cultivated Tuber-Plants.** — *Encyclopédie Scientifique, publiée sous la direction du Dr. Toulouse.* Paris, O. Doin, 1 vol. in-8°, p. 372.

M. Jumelle gives a rapid survey of the botanical characters and the cultivation of tuber-producing plants as well as of their diseases and pests. The crops mainly described are the potato, the manihot, the yam, the sweet potato, the arrowroots, etc. A bibliographical index is given.

France

ThÉRY. **The Potato.** — *L'Economiste Européen.* Paris, Nov. 4, 1910.

The potato is much discussed in France at the present moment. On account of the bad harvest this year, which did not reach 95 million quintals, present prices are high. At least half the potatoes consumed in France are used as food for cattle and for starch-production.

France

Potatoes are increasingly cultivated all over Europe; the entire European crop increased from an average of 1159 million metric quintals for the period 1899-1903 to 1206 million quintals for the period 1904-1908. In the United States there has been an increase of 66 million quintals in four years. To the production in Europe and the United States must be added that of the rest of America, Australasia, Asia and Africa, where the potato is more or less cultivated.

Potato production may be considered nearly as important as that of wheat, the world's production of which is not more than 900 million quintals.

JEHAN DE BRIE. **The Potato Question in France.** — *Le Fermier.* Paris, Oct. 20, 1910.

Notes on the varieties of potatoes for the French markets.

"The cultivation of some of our varieties of potato ought to be discontinued, because they do not offer sufficient resistance to disease. The English and the Germans grow new varieties of potato every year, obtained either by prolonged selection or by hybridisation, and the only difficulty is choice among so many good varieties.

France

"In a report issued in 1900, Heine declared that during 25 years he had studied 3311 varieties of potato, and that more than a thousand of these were of recent production. What an advance since the 11 varieties mentioned by Parmentier in his first catalogue!

"We are becoming familiar with some of the best new varieties of German importation. Only eight days ago, we had among others, on our great weekly market, the *Professor Wohltmann*, a very fine, large, elliptical potato, red skinned with yellow flesh, which yields 40 000 kg. per hectare; and the *President Krüger*, a still newer variety, with a round or roundish tuber, yellow skin and yellowish white flesh, which yields crops varying from 30 000 to 40 000 kg. per hectare.

The *Industrie*, well known in Belgium, the *Geheimrath Thiel*, the *Cérés*, *César*, *Ella* and *Oom Paul*, of Dutch origin will undoubtedly soon be seen on French markets; and if the United Kingdom should come to our aid even to a very small extent, we should know and appreciate the *Duchess of Cornwall* with half-yellow flesh and very robust, the *Puritan*, which gives enormous crops, the *Edward Wilm*, with a smooth skin and exquisite flavour, and, above all, the *Epicure*, white inside, but with a skin so wrinkled that it would seem to be fit for nothing but the pig-trough.

"It is known that the resistance of potatoes to disease is in proportion to the length of their period of growth. It is also acknowledged that nitrogenous manures ought to be used with moderation, and preference be given to phosphates and to potassic fertilisers.

"Finally it is most important to bear in mind the hereditary qualities of each variety because, as Aimé Girard has well said: *it is with potatoes as with animals; both transmit to their descendants their hereditary qualities.*"

The farmer must therefore give as much care to the selection of his stock of potatoes as he would to the selection of his breeding animals.

A New Potato. — *Bulletin de l'Union Centrale des Syndicats des Agriculteurs de France*. Paris, Nov. 1, 1910, p. 341.

France

M. Tingry, of Soissons, has grown this year in a small garden a variety of potato remarkable for the great development of the haulms, which reached a height of 2.43 m. The exact origin of these potatoes is not known, but they were brought to France from South America. Among other peculiarities they resist the attacks of *Phytophthora infestans* (Mont. de Bary).

Cultivation of Potatoes in Poland. (La culture des Pommes de terre en Pologne). — *L'Agriculture Commerciale*. Paris, 27 Nov. 1910.

Russian
Poland

Potato-growing in Poland has developed considerably. From 70 749 140 metric quintals, the average in 1903-07, the production reached in 1909 about 106 000 000 quintals. As Russia only produces double this amount on an area 40 times as large, the Polish crop finds a ready market in the interior. In Poland potatoes are used in large quantities in the distillation of alcohol and the manufacture of starch, so that their exportation is relatively restricted. The whole export goes to Germany and is used chiefly for industrial purposes.

EDWIN CHEEL. Raising Potatoes from the Seedberries or Fruits, with Notes on certain other Species of Tuber-bearing Solanums. — *Agricultural Gazette of New South Wales*, Oct. 4, 1910.

Australia:
New South
Wales

The writer describes experiments in the culture of potatoes obtained from seed of the variety *Blue-Eyed Russet*. After giving his results he con-

siders the question of the production of varieties capable of resisting the more common diseases. To attain this end, he recommends that the seed be selected either from those varieties which showed themselves more resistant than others, or else from plants rendered immune.

In the laboratories of the United States, experiments were made with the *Wilt disease* of cowpeas (*Vigna Catjang* Walp.) and it was proved that this complaint does not attack other species of leguminosae, nor even other varieties of the cow-pea itself. The same method should be employed in the study of varieties of the potato, including those obtained by crossing with more resistant varieties.

Cultivation of Lucerne for Seed at Tamworth (New South Wales).

(Tamworth Lucerne Seed). — *Agricultural Gazette of N. S. W.* October 4, 1910.

The cultivation of lucerne for the production of seed has rapidly spread in the valley of the Nemingha during the past few years. The soil, of basaltic and granitic origin, is very fertile, both light and deep, and is particularly adapted to the growth of lucerne. The seeds are as a rule obtained from plants 3 or 4 years old after the second December mowing. The crops vary from 3.60 to 7.20 hectolitres per hectare (from 4 to 8 bushels per acre), and are worth sometimes as much as from 933 to 1120 frs. per hectare. The dry winds frequently prevent normal flowering and fertilisation.

The price of the seed varies from 1.20 to 3.45 frs. per kg., and this explains why farmers grow this crop whenever the season permits.

TRABUT. "Chabdar" Clover (*Trifolium Suaveolens*). — *Progrès agricole et viticole*, No. 48, Montpellier, November 27, 1910, p. 670.

The Botanical Station of the Government of Algeria has been making some experiments with a new forage plant which seems likely to be very useful for the Mediterranean region. It is a clover, the *Trifolium suaveolens* W., a variety of *T. resupinatum* L., which it closely resembles from the botanical point of view, and is extensively grown in Persia and India. If sown early in the autumn, it gives several crops, and seems likely to prove superior to the red clover. It may be cut green in the rainy season, and if dried in May makes excellent hay. It is also one of the best possible green manures.

The Chabdar is therefore an important forage plant, and ought undoubtedly to be introduced into the rotations in Algeria, where it would prove useful (1).

(1) G. WATTS, (*Dictionary of the Economic Products of India*, vol. VI, part IV, p. 85) does not mention the *Trifolium suaveolens* among the Indian clovers. He men-

Common-
wealth
of
Australia:
New South
Wales

Algeria

W. P. BROOKS, E. S. FULTON, E. T. GASHILL. **Manuring Grass Land during Winter or in Spring.** — *Report of the Agriculturist*, IX, (XXII Annual Report of the Massachusetts Agricultural Experiment Station. Part I, p. 44, (36-45), Boston, 1910.

The interesting results of an uninterrupted series of manuring experiments made on ten plots of grass-land since 1899, five being manured in winter and five in spring, are given below

	Kg. of hay per hect.
<i>Manured in winter:</i>	
First cutting	7 890
Second cutting	516
Total	8 406
<i>Manured in spring:</i>	
First cutting	7 260
Second cutting	728
Total	7 988

The advantage of winter manuring is obvious, especially as when the manuring is to be done in spring, the manure must be heaped up on the land during winter and spread in the spring, which costs more in labour.

Cotton Cultivation and Industry in Greece. — *L'Office du Gouvernement Générale de l'Algérie*, Paris, Nov. 15, 1910.

In 1908, cotton was grown on 89 hectares of land in Greece and produced a crop of 95 481 kg., which rose to 99 790 kg. in 1909, although the extent of land was reduced to 80 hectares. In 1910 there were upwards of 243 hectares under cotton.

The average price obtained for Egyptian varieties of cotton is more than double that paid for Greek varieties. Experiments have been made with some American varieties, but the quantity of seed dealt with is so small that the results cannot be considered as conclusive.

Greece receives from 8000 to 10 000 bales of foreign cotton every year, 2500 of which come from America, from 5000 to 7000 from Turkey and 500 from Egypt.

tions only the following: *Trifolium fragiferum* L., or *Chit-batto*, found only in Kashmere; *Trifolium pratense*, from Kashmere to Gahrwal, especially at altitudes from 4000 to 8000 feet, where it constitutes a common fodder known as *Tre-patra* or *Chit-batto*; and *Trifolium repens*, called by the natives *Shaftal* or *Shotal*, which is common in several temperate and alpine regions of the Himalayas, and is also found in the Nilgiris and in Ceylon. The spontaneous varieties of this clover are, it seems, poisonous for horses. [Ed.]

Cotton Culture Experiments in Cyprus. — *Cyprus Annual Report for 1909-1910*, p. 26, London, 1910.

Experiments have been made with several varieties of cotton, including the *Culpepper Big Ball*, *Sea Island*, and *Allen's Long Staple*. The best results were obtained with *Sea Island*, and the comparison of this year's results with those of other years leads to the conclusion that the most suitable varieties for the climate of Cyprus are *Sea Island* and *Allen's Long Staple*.

Cyprus

Caravonica Cotton. — *The Tropical Agriculturist*, Colombo, Oct. 1910.

Experiments made in the Soudan in growing *Caravonica* cotton did not give good results, and the crops were greatly inferior to those of Egyptian cotton. The same thing occurred in India, where the failure may be attributed to drought, and the bad system of cultivation. In Queensland, on the other hand, where there is a greater rain-fall, excellent crops were obtained. In Lancashire, the thread of *Caravonica* cotton is considered too fine and delicate for ordinary fabrics. But at Berlin, a syndicate has been formed for the cultivation of this cotton in German East Africa. *Caravonica* yields 1 ton per acre (2500 kg. per hect.). About 90% of pure fibre being obtainable from a properly grown crop.

India.
Queensland,
German
East
Africa.
Soudan

A hybrid, *Mamara*, is at present being studied, which bids fair to become a serious rival of *Caravonica*.

Cultivation and Selection of Cotton at Montserrat, Leeward Islands. — *Report of the Botanic Station and Experiment Plots*, Montserrat 1909-1910, Barbados, 1910.

The work of cotton selection carried out in the trial ground of the Botanical Station at Montserrat, Leeward Islands, has had good results. Thus, during the present year, it has been possible to distribute to the chief cultivators in the island 90 lbs. of selected seed for purposes of experiment.

Leeward
Islands:
Montserrat

Among the most productive varieties may be mentioned: *Stirling* n.° 8, *Rivers* n.° 7 and *Gilberts* n.° 10, which yield respectively, 1617, 1125 and 1125 lbs. of seed cotton per acre (respectively 1811, 1260 and 1260 kilograms per ha.). In the plants submitted to control, the weight of 100 seeds varied from 10.10 — 15.00 grs. with a mean of 12.40 grs., and that of the fibre varied from 3.50 — 5.80 gr. with an average of 4.32 gr. There are therefore types of very voluminous seeds and others much less so; but there is no relation between the size of the seed and the fibre produced.

Peru's Cotton Industry. — *A Monthly Account of Peru's Development*, edited by John Valvasour Noel, Lima. *Peru, To-day*, July 1910.

Peru

Peruvian cotton is well known to-day in the markets of the world. In the department of Piura, and in the North of Lima, irrigation is employed on a vast scale. Indigenous labour is cheap and sufficient. Exportation is becoming important, amounting lately to about 20 000 tons, worth 5 million dollars.

The principal diseases which attack cotton have not spread in the Peruvian plantations, which may be considered almost free from them.

The produce of cotton per hectare varies with the age of the plants, but in plantations of 2-3 years' standing, which are the most productive, it amounts to 750 kg. of cotton per ha, with a yield of 35 % of fibre.

The cost of production of cotton is calculated at 0.55 dollar (2 fr. 75) per kilogram.

The varieties cultivated are the *Rough Peruvian*, *American Upland*, and varieties of *Sea Island* and *Mitaffi*; 65 % of the whole of the cotton produced is *American Upland*, 32 % *Peruvian*, and 2 1/2 % *Sea Island* and *Mitaffi*: 90 % of the crop is exported.

O. L. The Cultivation of Perennial Cotton in Hawii. (La Culture des Cotonniers vivaces aux îles Hawii). *Journal d'Agriculture tropicale*. Paris, N. 12, 30 Octobre 1910.

Hawaii

Experiments methodically carried out on cotton-plants in different parts of Hawaii, have given good results, and the Direction of the Experimental Station of Honolulu considers that, in certain localities, cotton is more productive than sugar-cane.

The cotton plants best suited to the Hawaiian archipelago seem to be the *Caravonica* and the *Sea Island* grown as perennials. The former is the more resistant to drought, because of the great development of its tap-root. The *Sea Island* is suited to the low-lying grounds of the coast which are relatively cool during the dry season; but it is being less grown, while the cultivation of *Caravonica* is continually extending. The latter, in fact, is more vigorous, its cuttings bearing fruit 5 months after planting.

Shield-grafting seems very successful, and well adapted to the multiplication of *Caravonica* on a large scale.

Cotton Growing in East Africa. *The Agricultural News*, Oct. 15, 1910, Barbados. (From *Textile Mercury*, September 3, 1910).

British
East
Africa

A concession has been granted to a syndicate for experiments in cotton growing on the banks of the River Juba, in East Africa. It is believed that

cotton can be produced equal in quantity and quality to Egyptian cotton. Transport is easy, and irrigation is abundant; the Juba overflows its banks in the same way as the Nile, and leaves deposits of rich fertilising soil. The scheme is on the point of being put into execution.

STEWART MC CALL. **Cotton Growing within the Empire.** - *Journal of the Royal Society of Arts*, London, Oct. 28th, 1910.

In Nyasaland 3000 more acres have been sown with cotton this year than last. The total area planted with cotton is now 12 000 acres. The quality is excellent, because Upland cotton, which has already been acclimatized, has been sown, and this grows well at different altitudes between 1000 and 3000 ft. In five years the production per acre has increased 70 %.

Nyasaland
and
Soudan

No other crop is better adapted to Nyasaland than cotton.

Plans are also being made for irrigating and cotton-planting in the Soudan, and £300 000 have been set aside for preparing the *Plain of Gazira*. This will render the irrigated cultivation of cotton possible on an area of more than 500 000 acres of fertile land, and later this acreage may be doubled and even trebled.

Cotton Growing Experiments in the Transvaal. - *The Agricultural News*, Oct. 15, 1910. Barbados. (*The Journ. of the Roy. Soc. of Arts*, August 16, 1910).

The first cotton crop in the Transvaal has been gathered on the Rusterberg Experimental Farm, and the quality compared excellently with similar United States varieties. The whole crop was very good, the first picking yielding 260 lbs. per acre, and some of the bolls that were exhibited were said to be particularly fine.

South
African
Union:
Transvaal

On the whole, the experiments show that cotton as good as American, if not better can be grown in the Transvaal, and under better conditions than in the United States.

Cultivation of Ramie (China Grass) (*Boehmeria*) in British India. - *The Indian Agriculturist*, vol. XXXV, No. 10, p. 316, Calcutta, Oct. 1, 1910.

The recent cotton crisis in India has brought up again the question of cultivating the *Boehmeria nivea* (*Urticaceae*), which grows well in the most different conditions of climate and soil. Its fibre is glossy, stronger even than jute, and from 7 to 45 cm. long, and it may be used for various purposes, stuffs, sail-cloth, ropes, etc.

British
India

The plant does not need much care, and grows rapidly, and the fibre may be warehoused for a long time without fear of deterioration; a most valuable point.

CHARLES RIVIÈRE. **Practical Observations on the Culture of Ramie (China-grass).** (Observations pratiques sur la culture de la Ramie). — *Journ. d'Agric. Tropicale*, 31 Oct, 1910, N. 112, pp. 289-291.

The attention of planters and manufacturers has been again turned to this fibre.

Success is certain when the crop is planted on suitable soil, that is to say, a good loam rich in humus containing a certain quantity of lime but not too much clay. The climate should be temperate, and the soil well drained as regards the winter rain-fall, the sub-soil water should not be salt, nor reach the roots, which descend fairly deeply towards the sub-soil. But however excellent the soil may be, irrigation is absolutely necessary to obtain several crops in climates with long dry periods, and in these it is necessary to allow at least 500-600 cubic metres of water per hectare, especially in rather old plantations where the water circulates with difficulty.

Algeria

Scarcely any cultivation is required, according to the writer, when good rhizomes completely occupy the soil. Up to this point the ground should be simply hoed, weeded, and watered; after this, any further treatment would do more harm than good.

The attention of planters has not been sufficiently drawn to the nature of the plant and, in many cases, want of success is due to the confusion made between *Rhizome* and *Root* which some vendors have not found it to their interest to distinguish.

Now, the rhizome alone sends out roots and a plant; the root remains inert and decomposes.

A plantation may last a long time on the same piece of ground; the Jardin d'Essais of Algiers possesses a plantation of 43 years' standing which has rarely been sufficiently manured or irrigated.

This old plantation has supplied hundreds of thousands of plants, which have been sent over the whole world, as well as material for a great number of experiments on the various processes for treating the fibre.

The writer nevertheless advises the rational use of nitrogenous and potassic chemical fertilisers, followed by watering.

Venezuelan Kapok. — *L'Agriculture pratique des pays chauds*, No. 91, Octobre 1910. (Bull. mensuel du Jardin Colonial et des Jardins d'essai des Colonies, p. 344, Paris, Augustin Challemeel.

The Colonial Garden in Paris procured during 1910 some samples of a kind of Kapok (1) from Venezuela which appears to be much superior to the true Kapok of Java and British India. Experts who have examined

(1) True Kapok from India is a vegetable down or floss produced in the fruit of a

France.
Venezuela.
Java

this material believe that if well prepared and cleaned it would fetch from 15 to 20 frs. more than good Kapok from the Dutch Indies.

A considerable quantity of the seeds of this tree, the botanical origin of which is not yet exactly known, has been sent to the various French Colonies in order that preliminary experiments may be made.

H. B. Nitrogenous Manure for Sugar Beets. (Düngungsversuche zu Zuckerrüben. Bericht über Fortschritte und Neuerung auf dem Gebiete des Rüben und Rübensamenbaues). — *Blätter für Zuckerrübenbau*, XVII J., No. 20, pp. 325-329, Berlin, Oct. 31, 1910.

This paper points out the very different results obtained by various experts with mineral nitrogenous fertilisers (Chili saltpetre, nitrate of lime, calcium cyanamide, ammonium sulphate), for sugar beets. An account is then given of Dr. H. Kaserer's experiments, which have established the important fact that phosphoric acid is the only useful artificial fertiliser out of the many added to stable manure for the cultivation of beets.

Germany

Indeed, the question of nitrogenous fertilisers for sugar beets is not settled yet, and new experiments are desirable.

V. PEGLION. Vegetation Anomalies in Seed-Bearing Sugar Beets, (Anomalie di vegetazione delle bietole zuccherine porta-seme), — *Boll. dell'Assoc. fra Impiegati delle Industrie dello zucchero, alcool ed affini*. Ferrara, ott. 1910, N. 7, pp. 148-151.

M. Peglion points out certain anomalies which occur during vegetation in seedbearing beets cultivated on an extensive scale by P. A. Barbé on the Ca' del Bosco Estate at Mezzano, near Ferrara, in Italy.

The "Standard" roots were grown and selected at Avezzano, in the Abruzzi, where they remained stored in silos during the winter. They were then sent to Mezzano, to be planted for seed production. The following are the main anomalies observed at Ca' del Bosco.

Italy

Some of the roots, which had taken perfectly after transplantation, had grown to nearly double the ordinary weight, and showed a notable enlargement of the crown and the formation of four to six large tufts of leaves without any sign of floral shoot.

Other roots, which had also taken well and had grown remarkably after transplantation, sent forth shoots which at a height of from 30 to 40 centimetres, and from 20 to 25 mm. in diameter at the base stopped growing,

Malvacea *Eriodendron anfractuosum* D. C. Synonymous with *Bombax pentandrum* L., growing in British India.

See: G. WALT, *Dictionary of the Economic Products of India*, London and Calcutta, 1890, vol. III, p. 258. [Ed.]

and produced a terminal rosette of long-stalked but small leaves, without any trace of floral organs.

In other roots, most of the shoots ended in bunches of leaves, of which only a few bloomed, the flowers being very small, although normal, and generally single, rarely in couples, growing either on the main or the lateral flower stems.

These peculiarities are not interesting only from a scientific point of view, for in some plots more than 25 per cent of the roots were in this condition, a very serious inconvenience considering the object of the plantation.

A parasitic origin of the defect is excluded, the most probable explanation being that there was some imperfection in the preservation of the roots in the silos; this storing is considered necessary as a precaution against frost, but it may have prevented some parts of the roots from seasoning properly and having complete winter rest.

G. E. NESOM. **New Sugar Cane Varieties in the Philippines.** — *The Philippine Agricultural Review*, Vol. III, No. 10, Oct. 1910, p. 598. Manila.

Philippines

In tropical countries sugar cane is generally grown by planting the tops of the canes, from 25 to 50 cm. long; in sub-tropical and temperate zones the usual method is to plant portions of the cane before it is quite ripe. For two years past attempts have been made to grow cane from seed, the English being the first to make these experiments at the Demerara Station.

Seed grown plants are nearly always differentiated from the mother plant; each one is known by the initial letter of the country where it was grown and by a progressive number. Among the seed-grown canes of Demerara the D. 74 is at present much cultivated in Louisiana.

The Louisiana Experimental Station experimented with cane seed from all parts of the world in 1909 in the hope of obtaining still better varieties.

In Hawaii, the Experimental Station of the Planter's Association has already obtained some new varieties, slips of which were sent to Manila and are planted on the Government Farm at Alabang.

Sugar Cane Varieties in Queensland. (The Queensland Campaign). — *The Louisiana Planter and Sugar Manufacturer*, Vol. XIV, No. 17, pp. 264-265, New Orleans, Oct. 22, 1910.

Australia: Queensland

The sugar content of the cane gathered in Queensland this year was very high:

Variety	Sugar	Purity
Striped Singapore	19 %	95.9 %
D. 1135	19.8 %	93.7 %

The variety D. 1135, imported some years ago from the West Indies to Queensland, is rapidly replacing all the other varieties, on account of its good yield and its resistance to frost and drought.

Paper from Bagasse. — *The Agricultural News*, Oct. 15, 1910, p. 325, Barbados. From *The Bulletin of the Imperial Institute*, Vol. VIII, p. 151.

In a paper read at the recent International Congress of Tropical Agriculture at Brussels on the manufacture of paper from bagasse or refuse of sugar cane stalks, it was stated that the late Mr. de Lamarre had made fairly good commercial paper from bagasse at the Tacarigua Factory, Trinidad. The best results were obtained by blending bagasse with bamboo and Para grass. It is estimated that there is about a ton of fibrous waste for each ton of sugar produced, and this, made into a pulp with bamboo fibre and Para grass, would be worth £ 15 per ton (1).

Trinidad

Production of Paper from Sugar-Cane Fibre. — *Journal of the Royal Society of Arts*, London, Nov. 4th, 1910.

It was known that excellent paper could be made from the residue of the Sugar-cane (bagasse) but the problem was, how the fibre could be preserved intact while extracting the sugar.

The difficulty has been almost completely overcome by means of recently constructed machines. The fibre is separated mechanically from the pulp, then the water is removed by evaporation, which leaves in the dry fibre and in the pulp (already separated) the solid substances and the saccharose. With this system the fibre remains intact and adapted for making paper, while the pulp is taken to the sugar-factories.

Cuba

The residue of the pulp can also be used in the manufacture of common paper.

A manufactory has been set up in Cuba for the separation of the fibre and pulp on the above system.

S. G. RUEGG. **The Decline of Sorghum as a Sugar-producing Plant.** — *The Louisiana Planter and Sugar Manufacturer*, Vol. XLV, No. 20, pp. 307-308. New Orleans, Nov. 12, 1910.

United States

The writer recalls the introduction of Sorghum from China into France,

(1) Para-grass is a fodder plant known in South America under the Spanish name of *Malojilla* (Ann. Rep. Porto Rico Agricult. Exper. Stat. for 1909, Mayaguez, 1910, p. 41).

Para-grass (*Panicum molle*) comes originally from Africa, whence it was introduced into Brazil, in Venezuela, in the West Indian islands. It is cultivated especially in Trinidad, where Para-grass is considered the best fodder for cattle, especially for dairy-cows.

See H. GEMLER, *Die Tropische Agrikultur*, Wismar, 1892, Vol. IV, p. 453. [Ed.]

and thence, in 1854, into the United States, where the cultivation of the plant spread to 44 States and territories of the Union. It was then recognized, that a sandy calcareous soil with a dry subsoil and good exposure, sunny and well ventilated was the best for sorghum. The climate should be neither too wet, nor too dry, and should come within the extreme limits of 508—1778 mm. (20 to 71 inches) of rainfall.

The *early Amber* variety from Minnesota, ripens in 80 days; the *White Mammoth* in 102; and the *Orange* in 163 days.

The *early Amber* is the variety preferred, especially in Wisconsin; its composition is as follows:

Derees Brix	13.5%
Saccharose	7.3
Glucose	4
Mineral substances (ash)	1.9

The cultivation of Sorghum however is steadily decreasing, as is also the out-put of its sugar or syrup, and of the alcohol and vinegar which are its secondary products. There is also a remarkable decrease in the cultivation of varieties used for fodder. Maize has taken the place of Sorghum, and its cultivation is increasing rapidly in the United States.

The soil favourable to Sorghum, is equally so to maize, which has the same fodder-properties. Maize corn is used more and more as fodder.

Ground-Nut (*Arachis hypogaea*) Experiments in Malabar. — *The Tropical Agriculturist*, Colombo, October 1910.

British
India

Ground-nut, which two years ago was unknown in Malabar, is now doing well in Palghat. About 500 acres were planted there last year. The overseers (*tahsildars*) in all the other districts (*talugs*) are struck with the abundance of the crop. Though it has now been shown that ground-nut will succeed on any dry land if sown in May or June. Mr. Francis suggests growing it experimentally as a second crop on damp soils that have grown but one crop hitherto. Should this prove a success, very important results may follow, as there are thousands of acres in Malabar that lie fallow half the year, except for a scanty crop of gingelly (*Sesamum indicum*) or a few vegetables (1).

(1) *Arachis hypogaea* (Ground-nut, Pea-nut, Monkey-nut, Manila-nut, Chinese-nut, etc). "Although grown here and there all over India as a garden and even an occasional field-crop, it is only in Madras and Bombay that the pea-nut is produced on a commercial scale." In 1889-90 Madras alone was returned as having had 279 355 acres under this crop, of which 185 876 acres were in South Arcot, the chief seat of South Indian ground-nut production. In 1906-07 the Madras area was 507 600 acres, while that of Bombay is only 93 800 acres.

For a revolution in the Pea-Nut production in India, due to the introduction of

A Sunflower Farm. — *The Natal Agricultural Journal*, vol. XV, No. 4, p. 508. Pietermaritzburg, Oct. 1910.

In the district of Wide Bay, situated on the plateau of Binjour (Queensland), there is a farm entirely devoted to the cultivation of Sunflowers (*Helianthus annuus*). The seed crop, has amounted to about 50 bushels per acre, (45 hl. per ha). The oil extracted can be employed in soap manufacture.

Australia:
Queensland

The Oil Palm, *Elaeis Guineensis* in Madagascar. — *La Quinzaine Coloniale*, Paris, Nov. 10, 1910.

In a geological tour through the West of Madagascar, M. Perrier found that the Oil-producing palm *Elaeis Guineensis* (1) grows in abundance in the valley of the River Tziribihina. The industrial value of the products of this palm make the discovery of considerable interest to Madagascar.

Madagascar

J. MASFERRÉ. Coffee Growing in the Philippines. (Cultivo del Café en las Filipinas). — *La Hacienda*, Buffalo, N. Y. U. S. A., Nov. 1910, vol. VI, pp. 35-38.

The writer is of opinion that the coffee plant should never be allowed to grow from a single stem, because it then does not bear abundantly and the berries are difficult to gather. If the plant does not begin to grow branches by the time it is 2 or 3 cm. or a little more, in diameter, it should be bent downwards and fixed at an angle of 45°, first in one direction and then in another; this forces the growth of new branches. The best period to begin bending is just before the plant blossoms. Six branches at most should be preserved; those furthest from the soil and those growing in the same direction should be pruned off.

Philippines

It is not advisable to nip the highest branches in order to make the plant spread.

The Cultivation of Coffee. — *The Philippine Agricultural Review*, Vol. III, No. 9, p. 52, Manila.

Philippines.
Australia:
Queensland

Deep, rich and healthy soil is necessary for the growth of the coffee

good varieties of seed, and for extensive information on this important Indian crop, see Sir GEORGE WATT, *The Commercial Products of India*, London, 1908, p. 74.

Arachis is a leguminous plant and should profit by inoculation, without which the crop is likely to decline. It is interesting to note from this point of view that in India silt is considered a specially good manure: "Sabba Rao observes that the best manure appears to be the silt deposit of tanks, and so highly is this valued that the cultivators carry silt from great distances and pay high prices for the privilege of removing it."

[Ed.]

(1) The *Elaeis Guineensis* produces palm-oil, used in the manufacture of candles and soap.

[Ed.].

plant, which is sown in nurseries, in rows 15 cm. apart each way. The plants must be sheltered from the sun until they are 15 or 20 cm. in height, and at 30 cm. they may be transplanted. In Ceylon, the plants are usually set at a distance of from 1.50 to 1.80 m. from one another in all directions, but in the Philippines 2.10 or even 2.40 m. is advised. When the plant is sufficiently developed, it is cut back to a metre or little more from the ground, and staked on account of the wind. It is in full production by the 3rd year.

The fruit or "cherry," which resembles a cherry and encloses two grains, "beans," is passed through a machine which removes the pulp from the beans; the latter are left to ferment in tanks for one or two days, and are then washed, dried and packed for exportation.

Indian planters estimate that the first crop averages about 20 tons per 100 acres (40 hectares), and that good crops of the third and fourth year may be as much as 40 tons. In Queensland, where in 1905 318 acres (128 hectares) were producing out of 394 acres (160 hectares) under cultivation, the crop was 83 518 lbs. (37 894 kg.); while at Herbeston 615 lbs. were gathered per acre (1) (690 kg. per hect.).

The coffee plant requires thinning and bud-nipping as well as winter pruning and, old or neglected plants, special cutting back. During the last ten or twelve years, several new methods of cultivation have been proposed, the abolition of pruning being one of them, and, in fact, this could be greatly reduced with advantage after the first four years.

The question as to whether it is advisable to shade the plantations with other trees has been much discussed and is not yet solved. There are undoubted advantages in this method for dry countries, especially if the trees adopted are Leguminosae, which enrich the soil in nitrogen. The best Leguminosae for this purpose in Queensland are the following: Gwango (*Pithecolobium Saman*), the *Madre de cacao*, of Nicaragua (*Gliricidia maculata*), the *Albizia stipulata*, the *Albizia Lebbek*, the *Albizia moluccana*, and all the *Erythrinae*, several of which are native plants. The shade-trees should be planted at the same time as the coffee plants.

It is advisable to grow coffee plants with bananas for the first four or six years, but association with other plants, even annuals, is not advisable. As to fertilisers, coffee plantations are made on such rich land, as a rule, that they can easily do without them for several years. Chemical fertilisers are used in old plantations when the beans are of a milky consistency. After the crops are gathered, the soil is treated with manures

(1) In India the mean yield for some years before 1906 would appear to be a little over 100 lb. to the acre, but it fluctuates very greatly; thus in 1903 the mean yield would appear to have been 139 lb., while in 1901 it was only 65 lb. It is probable however that in all the larger and better worked plantations an average yield of 2 to 3 cwt. is usually obtained.

See Sir GEO. WATT. *The Commercial Products of India*, 1906, p. 370. [Ed.].

containing stable manure or with composts for which the pulp of the coffee berry can be utilised. Green manuring with leguminous plants is both satisfactory and economical.

B. BELLI. Coffee: Its Country and Importance. (Il caffè. Il suo paese e la sua importanza). — Ulrico Hoepli, Milan, 1910, pp. xxiv-395

This book deals with the history of coffee, with other works written on the subject, its cultivation, especially in the State of São Paulo, Brazil, and finally, the world's production of coffee.

Statistics show that the average annual production of coffee from 1820-21 to 1829-30 was 1 650 000 bags (60 kg. each), 300 000 of which came from Brazil. In 1901-2 the output had increased to 20 000 000 bags 16 250 000 of which produced by Brazil (1).

Transport facilities, which are continually increasing with the development of the railways, together with the immigration of Italian labour, have helped to convert St. Paulo into a great coffee mart. It is calculated that there are about 700 million coffee plants in this region.

The following table will give an idea of the coffee export from 1895-96 to 1907-8.

For Europe. . .	61 261 921 bags	= 64.57 %
» America . . .	32 239 623	= 33.98
» Africa . . .	358 616	= 0.39
» Asia . . .	117 441	= 0.14
» Various . . .	628 013	= 0.58
» the Coasting trade	301 133	= 0.34
		94 906 747 bags = 100.00 %

The total importation of Brazilian coffee into Italy has been continually increasing since 1900-1, as is shown by the following table:

Year 1899-1900 . . .	232 000 bags
1900-1901 . . .	273 900 "
1901-1902 . . .	267 700 "
1902-1903 . . .	285 000
» 1903-1904 . . .	290 900
1904-1905 . . .	305 200
1905-1906 . . .	329 080
» 1906-1907 . . .	358 970

This book also deals with the markets, customs duties, the price of coffee, its physiological properties and chemical composition; it treats also of coffee roasting, and coffee substitutes and adulterations, with information about banks, etc. There are 40 tables, 7 diagrams and a map of the coffee districts in the State of São Paulo.

(1) The world's production of coffee has been estimated at close on 15 million bags (132 lb. each) of which 11 1/4 million bags are furnished by Brazil. See GEO. WATT, *The Commercial Products of India*, 1906 [Ed.]

A. JACOTOT. **The Cultivation of the Coffee-plant, its Future in the French Colonies.** (*La Culture du Caféier, son avenir dans les Colonies françaises*). — *Thèse pour le doctorat*, vol. 184. Paris, Ed. Larose.

The writer reviews the coffee production of the world, its consumption, and the crisis of over-production, which occurred after the two exceptional crops of 1901-1902 and of 1906-1907. M. Jacotot bases his remarks on the fact that France consumes about 100 million kilograms of coffee, of which one million alone is supplied by its colonies. Passing on to the study of the present conditions of the cultivation of the coffee plant in the French colonies, he comes to the conclusion that, everywhere in the new French colonies, the industry is in its infancy, having suffered from the fall in price, which has turned the attention of planters to more paying crops, such as cacao and indiarubber.

French Colonies

The cultivation of coffee deserves encouragement, for if undertaken properly and concurrently with that of other crops, it may become a lasting source of wealth. Mr. Jacotot considers that "the best encouragement which can now be given to the cultivators in the French colonies is the admission of their coffee into France free of all duty."

The coffee-producing countries of the present day are within the 28th degree of S. latitude and are as follows:

In America: Brazil, Mexico, Central America (Guatemala, San Salvador, Costa Rica, Nicaragua), the Antilles (Haiti, Jamaica, Porto Rico, and Guadaloup), Dutch and English Guiana, Venezuela, Columbia, Ecuador, Peru and Paraguay.

In Asia and Oceania: the Dutch Indies, India and Ceylon, French Indo China, New Caledonia, Manilla, Arabia.

In Africa: Abyssinia, and the various European possessions (German and English East Africa, the Ivory Coast, Belgian and French Congo, Madagascar, Réunion) possessions which contribute little to the total production of coffee.

The world's production, which in 1825 did not exceed 1 650 000 bags of 60 kg. each, reached, with the famous crop of 1906-1907, the extraordinary amount of 23 920 000 bags. Brazil alone furnishes more than $\frac{3}{4}$ of the whole amount produced. The mean output of the other countries per annum, from 1900-1910, was about 3 900 000 bags, i. e. 234 millions of kilograms, of which only one million was produced by French colonies. And this, although the cultivation of the coffee plant in Martinique, Guadaloup, Réunion and French Guiana dates back to the XVIII century. But in these old colonies, this industry has had to compete with that of the sugar cane and to contend with disease, want of labour, and with *Hemileia*. Its decline in the nineteenth century is noticeable, nevertheless M. Jacotot sees, in the grafting of West Indian varieties on Liberian stocks, a possibility of enlarging

the area of the coffee-plant. Of late years the exportation from Guadaloup, Réunion, and New Caledonia tends to increase again.

Experiments have been, and are still being carried out in the new colonies. Prospects in Tonkin are brighter than could have been expected at one time when the coffee crop was threatened with diseases and pests especially the insect called the *Borer*, the larvae of which devour the pith of the plant.

Experiments made at Madagascar, prove that neither Arabian nor Liberian coffee-plants can resist the attacks of *Hemileia*. The exceptional qualities of the Congo coffee plant are now well known, and it appears more likely to replace the Liberian than the Arabian variety. The exportation from Madagascar reached 93 368 kg. in 1908, as against 177 kg. in 1901, which speaks well for the future.

In French East Africa coffee can only be grown in Guinea, on the Ivory Coast, and at Dahomey. From the first place the exports are at present very small, but according to M. Chevalier, *Coffea stenophylla* appears to give good returns there.

The Ivory Coast, from the great richness of its soil, seems more suitable than even Guinea for the production of coffee. At Dahomey, the experiments hitherto made have yielded unsatisfactory results, and the industry there seems to have but a limited future before it. At Cheri, in the French Congo, M. Chevalier found *coffea excelsa*, the aroma of which places it among the best kinds, and which is capable of further improvement by careful cultivation. Coffee-growing is likely to prosper in the Congo.

Russian Tea-Growing. — *The Tropical Agriculturist*. Colombo, Oct., 1910.

Russian tea planters are taking advantage of the increasing consumption of tea in Russia to resume culture on their abandoned plantations. These were thoroughly weeded and cleaned last year and are likely to yield this year a good crop of green tea. There are thirteen villages near Batum entirely devoted to tea culture. The total return from these tea-crops amounted to £17 700 in 1908, and last year the crops were nearly doubled.

Russia

O. LABROY. **Cultivation of Maté in South America.** — *Journ. d'Agric. Tropicale*, Oct. 30, 1910, No. 112, pp. 291-295.

The Maté extractive industry in South America is gradually becoming an agricultural industry. Plantations are extending in those parts where the plant grows wild, and well equipped works prepare the raw article for export to European markets, where there is already some demand.

Encouraging results seem to have been obtained at Nueva Germania and Villa Ricca in Paraguay, Rosario and Sant'Ignacio in Argentina and in

Paraguay
Argentina
Brazil

South Brazil; but precise data are still wanting on the yield and productive period of the tree, and the price per kilo of maté compared with the cost of production.

The South American planters began by using seeds and young plants obtained from good native producers. Scientific study of the Maté ilex and its culture conditions by an expert would enable planters to select the best types. The *Ilex paraguayensis*, considered as the genuine maté holly, is not the only species used, or, if so, it comprises a number of varieties, very unequal in value, which should be carefully studied, to determine the respective merits of varieties known locally as: *Long-leaved Yerba*, *Round-leaved Yerba*, *Congoninha Mansa*, *Congonha des Misiones*, *Yerba Morada*, *Y. branca*, *Y. amarella*.

The writer gives statistics of the development of maté cultivation and of the exports of 1908 and 1909, as well as technical information on the choice of soils, the laying out and management of plantations, the preparation of maté on the spot and in the works, and on the method of making the infusion.

A. STUTZER. Manuring Experiments with Tobacco and Tomatoes in Peaty Soil. (Düngungsversuche für Tabak und Tomaten im Hochmoorboden). -- *Die Ernährung der Pflanze*, Stassfurt, Nov. 1910, No. 22, pp. 213-215.

Experiments have been made at the Experimental Farm of the Institute of Agricultural Chemistry at Königsberg for the purpose of studying the growth of tobacco and tomatoes in peaty soil.

Germany

Pots were used containing, for the tobacco, about 1.5 kg. and for the tomatoes about 3 kg. of peat, dried in the air. A Havana variety of tobacco was used and two varieties of tomato, the *Roosevelt* and the *Johannisfeuer*. Both tobacco and tomatoes were sown in a hot bed, the tomatoes being transplanted into the pots on May 13 and the tobacco on June 13.

To each tobacco pot were added 5 gr. of Thomas slag, 1 gr. of magnesium sulphate and 2 gr. of sulphate of potash. On June 15, 0.2 gr. of nitrogen in the form of nitrate of lime were added to each of the pots from no. 2 to no. 6. Pots no. 3 to 6 were further treated with nitrogenous and potash fertilisers in June and August. The following are the figures for each pot:

No. of the series of pots	Nitrogen	Phosphoric acid	Potash
1	0 gr.	0.75 gr.	1.0 gr.
2	0.2 »	»	1.5 »
3	0.4 »	» »	1.5 »
4	0.6 »	» »	1.5 »
5	0.8 »	» »	2.0 »
6	1.0 »	» »	3.0 »

Each series included 4 pots. Only the 5 upper and the 5 middle leaves of the tobacco were considered.

The results were:

No. of series of pots	Size of leaves when harvested Average length	Average width
1	20 cm.	9-10 cm.
2	25 »	14-17 »
3	27 »	14-19 »
4	34 »	18-20 »
5 and 6	36 »	20-24 »

Fifteen leaves were taken from three pots of each series to determine the dry matter:

No. of series of pots	Middle leaves	Upper leaves	Total gr.
1	6.5 gr.	(not determined)	—
2	15.0 »	7.2 gr.	22.2
3	21.5 »	10.0 »	31.5
4	29.0 »	24.5 »	53.5
5	31.5 »	22.0 »	53.5
6	34.5 »	19.5 »	54.0

The dry matter of the leaves contained:

No. of series of pots	Chlorine	Potash	Ash
1	0.65 %	3.08 %	9.89 %
2	0.47 »	3.08 »	10.16 »
3	0.57 »	3.08 »	10.18 »
4	0.59 »	3.72 »	10.79 »
5	0.50 »	4.27 »	9.64 »
6	0.48 »	4.48 »	10.18 »

The dry matter of good tobacco leaves should contain less than 0.6 per cent of chlorine and about 6 per cent of potash, The higher the potash content and the weaker the proportion of chlorine, the better is the combustible quality of the tobacco.

These experiments shewed that tobacco could be grown well even in a high peaty soil and in the climate of East Prussia.

For the tomato experiments the soil was manured with Thomas slag, nitrate of lime and salts of potash at 40%. Each plant gave on an average 3.2 kg. of fruit.

The article is illustrated by several figures.

Royal Experimental Station for Tobacco Cultivation at Debreczen (Pallag).

(Les Institutions Agricoles Hongroises. Edition du Minist. Royal Hongr. de l'Agr.). Budapesth, 1910.

Hungary

This Station is making experiments for improving the cultivation and manipulation of tobacco, as well as the quality. Experimental cultures are being made, with the aid of the tobacco growers, on the Experiment fields at Debreczen and Csaba.

A. SPLENDORE. **The Relation between the Age of the Reproductive Organs of the Tobacco Plant and their Fertilising Activity.** (Influenza dell'età degli organi di riproduzione del tabacco sull'attività fecondativa). — *Bollettino tecnico coltivazione tabacchi. R. Istituto Sperimentale in Scafati.* Sept.-Oct. 1910, No. 5, pp. 273-277.

Experiments were made with the *Virginia Orinoco* (typical) and the *Comstock Spanish* (Brazilian) varieties, and comparison was made between the following:

- Italy
- 1) Young stigmata (well formed and without viscous liquid) and fresh, ripe pollen;
 - 2) Viscous stigmata (ripe) and pollen as above;
 - 3) Viscous stigmata (ripe) and withered pollen (old, turning gray);
 - 4) Withered stigmata (old, turning brown) and fresh, ripe pollen;

The numerous data in this paper show that viscous, ripe stigmata and ripe fresh pollen have the greatest fertilising activity and produce the largest quantity and best quality of seed in the *Virginia Orinoco*; next in order come young stigmata joined to fresh, ripe pollen, but the seed is on the whole much more delicate. Withered pollen and viscous stigmata give satisfactory results. The stigmata are very sensitive to fertilising reaction; as soon as they begin to fade, even if treated with the best pollen, the formation of seed decreases by about 45 per cent in comparison with that of viscous stigmata and ripe pollen.

The experiments with the *Comstock Spanish* led to much the same conclusions.

The Tobacco Industry of Smyrna. — *Journal of the Royal Society of Arts.* London, Nov. 4, 1910.

Turkish Empire

The *Magnesia* variety of tobacco, which was formerly cultivated in the *Hinterland* of Smyrna, has been replaced by the variety *Ayaso louk* (ancient Ephesian). In order to have good results, this variety must be grown with others in the proportion of 3 to 10, and even then, it exhausts the best fields in 5 or 6 years.

Tobacco is grown in 3 regions: the upland, the low upland and the plain. The uplands yield from 88 to 110 lbs. per *stremma* (1.6 of an hectare), the low uplands from 143 to 200, and the plains from 220 to 600 lbs. per *stremma*. The main production centres are: Giaour Keni, Scala Nova, Thyra, Baindir, Ghermonda, Ak-keni, Melessos and Cara Aghania. The total crop in good years is about 5 660 000 lbs.

L. BR. **Tobacco Growing in the Philippines.** — *Journ. d'Agric. Tropicale*. Paris, Sept. 30, 1910, No. 111.

Mr. J. S. Hord, in a communication to the *Philippine Agricultural Review*, affirms that the new Customs tariff of the United States, by favouring the products of the Philippines, seems, indirectly to have had a bad effect on the quality of the tobacco produced there. Only four or five plantations are cultivated with rational methods, and the 20 000 small planters who have each about half a hectare under cultivation, use so little care in gathering the crops and preparing the tobacco, that it is always of a very poor quality. This state of things is likely to lead to the loss of European custom unless rational methods are rapidly enforced.

Philippines

Mr. Hord suggests a return to the old methods, consisting in the use of those plants only, which have been selected in the nurseries by an experienced staff, the destruction of all leaves of inferior quality, and he insists upon the planters having proper appliances for fermenting and drying the tobacco.

Tobacco Industry in Panama. — *Peru To-day*, vol. II, No. 3. Lima, May 1910, p. 28.

The Government of the Republic of Panama is taking great interest in the cultivation of tobacco. The plantations continue to extend, even in new districts. A variety of native tobacco is produced in nearly all the provinces of Panama, especially at Chiriqui and Chame. The soil is very well suited to this cultivation, but the product is of medium quality as yet, on account of insufficient care.

An experienced horticulturist, Mr. H. F. Schultz, in a recent report to the Ministry of Fomento, states that with proper care a tobacco equal to the best products of Cuba and Florida could be obtained in Panama. Tobacco can be cultivated all the year round, but the beginning of the dry season is the most favourable period.

F. WAGNER. **Experiments with Fertilisers on Hops (*Humulus Lupulus*).** (Vierjährige Kalidüngungsversuche des Deutschen Hopfenbauvereins 1903-1906). — *Die Ernährung der Pflanze*. Stassfurt, Nov. 1910, No. 22, p. 217-218.

Germany

Hops that are growing well, take about 79 kg. of nitrogen, 91 of potash, 30 of phosphoric acid, 147 of lime and 54 of magnesia per hectare

out of the soil every year. The "German Hop-Growers Union" (Deutscher Hopfenbau Verein) has had experiments made on the following plan during several years:

Plot 1) Not fertilised.

- » 2) Usual stable manure.
- » 3) Manure without potash.

100 gr. ammonium sulphate and 120 gr. Thomas slag, per plant.

- » 4) Complete manuring with Martelline (1).

Per plant: 100 gr. ammonium sulphate.

» 120 gr. Thomas slag.

» 115 gr. Martelline with 25 per cent of potash.

- » 5) Complete fertiliser with salts of potash at 40 per cent.

Per plant: 100 gr. ammonium sulphate.

» 120 gr. Thomas slag.

» 70 gr. salts of potash with 40 per cent of potash.

The following are taken from the tables of results:

The yield of hops was lowest on the plot that had not been manured, and increased with the numbers as above, the complete manure giving the largest crop.

The quality of the hops followed the same gradation. The action of the potash was favourable both in compact and in light soils. On the whole, the effect of Martelline on the quality and quantity of the product was better than that of the salts of potash at 40 per cent, but not invariably. The potash manure, as a rule, strengthened the resistance of the plants to drought, and to vegetable and animal parasites. The blossoming of the plant, and the ripening of the cones and falling of the leaves took place earlier on the plots not manured, or simply treated with stable manure. The results with stable manure were, on the whole, inferior to those obtained with a complete manure. The colour of the leaves was deeper in plants grown with potash manure.

In some experiments lasting four years, excellent results were obtained from several soils by using mineral instead of organic fertilisers.

The writer gives data on some economic questions, together with some tables and a diagram.

(1) Martelline is a mixture of potassium silicate and peat; its potash content may be as much as 28 per cent. [Ed.]

The Hop Harvest in Bohemia. — *Feuille d'information du Ministère de l'agriculture*. Paris, Nov. 1, 1910.

There has been an excellent crop of hops in Bohemia this year, the amount at Saaz alone being about 77 500 quintals (of 100 kgs. each) or $6\frac{1}{2}$ quintals per hectare over an area of 11 200 hectares, which last year yielded only $3\frac{1}{2}$ quintals. In the district of Auscha (Aussig) Rotland the crop is estimated at 20 000 quintals on an area of 2100 hectares.

The yield in the lower part of the Poleppe plain was 6500 quintals, or about $8\frac{1}{2}$ quintals per hectare against 3.6 last year. The plantations in the Danba district were very unequal in their yield.

The crop in the whole of Bohemia was about 111 500 quintals, and although the development of the hops was very unequal this year, the quality was good. The colour also was satisfactory, in spite of the bad weather.

**Austria:
Bohemia**

NEUMANN. Simple Method for obtaining Early Green Peas. — *Bull. de la Soc. d'hort. et de vitic. d'Eure-et-Loire*. Chartres, October 1910, No. 22, pp. 422-424.

The peas should be sown in pots during the winter, and the pots sunk in the ground, so as to protect the soil from frost. When the young plants have reached a certain growth, they are transplanted in the open, and if early varieties, such as the *Express*, are chosen, peas may be gathered as early as May 15.

It was observed that peas grown by this method are more vigorous than those grown on the spot, and that they are less affected by the attacks of vegetable and animal parasites.

E. G. CAMUS and A. CAMUS. Botanical Study of cultivated Basils. (Etude botanique des Basilics cultivés). — *Bulletin Scientifique Industriel*. Roure Bertrand fils. Grasse, Oct. 1910, pp. 22-38.

Most of the cultivated basils come from India, where they are very popular, both as remedies and as condiments. They are similarly employed in Europe, especially in the South. After describing the wild plant, this paper deals with the varieties, or species which are rarely cultivated for industrial purposes, or grown for culinary uses. The descriptions, and the anatomy of the type *Ocimum Basilicum* and its varieties, are made clear by means of three plates.

France

The greatest yield of essential oil is obtained by distillation from the variety *crispum*, the characteristics of which are described. The variety with curled leaves is not inferior to the ordinary one, either in scent, or essential oil, and is the most interesting from every point of view.

The amount of estragol in all the varieties is about 55%.

W. P. BROOKES. **Experiments in Manuring the Cranberry (*Vaccinium Macrocarpon*).** — *Annual Report of the Massachusetts Agricultural Experiment Station*, Part I, pp. 28-33, Boston, 1910.

Experiments have been made, in union with the Cape Cod Cranberry Growers' Association, on 33 plots of soil, each of 0.02 ha, to determine the manure suited to the cranberry.

1) The mean production per hectare of all the plots was:

Unmanured	135	hl. per hec
Manured (nitrate of soda, superphosphate, potash salts)	241-276	» »

2) The employment of nitrate of soda, in quantities exceeding 112 kg. per ha., appears seldom necessary.

3) The favourable influence of sulphate of potash is shown in a decisive manner. It assists ripening, and improves colour and quality. The heaviest crop, 405 hl. per hec, was due to the predominance of potash manure.

4) The effect of phosphoric acid appears to be less beneficial; nevertheless, superphosphate apparently causes early maturity and brilliance of colour.

Flower Crops in the South of France. (Les récoltes florales du Midi de la France). — *Bulletin Scientifique Industriel*, Roure Bertrand fils, Grasse, Oct. 1910, pp. 59-65.

The writer gives information on the crops, with prices, production, and the conditions of the season.

The following are the flower crops and their months of production:

Violets	= February-March-April;
Mimosa	= February-March;
Jonquil	= April-May;
Narcissus	= April-May;
Broom	= May;
Orange-blossom	= May;
Rose	= May-June;
Mignonnette	= July;
Pink	= June;
Jasmine	= July-October;
Tuberose	= August-September;
Cassia	= October-November.

(1) "The Large Cranberry (*Vaccinium macrocarpon* Ait.) is now cultivated on hundreds of acres of boggy land in North America. The three principal varieties of cranberry are now a staple article of food in North America and an effort has been made to open an European market. The export trade has now assumed some importance, and is growing."

BAILEY, *Cyclopedia of American Horticulture*, New York, 1909.

[Ed.]

The Bulb Industry in Holland. (Daily Consular Reports). — *Modern Miller*, vol. 36, No. 5. St. Louis, Nov. 5, 1910, p. 11.

The regular cultivation and exportation of flower bulbs has been carried on in Holland since 1750, but the trade did not begin to attain its present enormous proportions until the last 20 or 30 years of the XIXth century. At first bulbs were grown only at Haarlem, but the industry has since spread wherever conditions were favourable. The preparation of the soil for bulb cultivation is often very costly, and the value of the best plots varies from £320 to £500 per acre (20 000 to 31 247 frs. per hectare).

The export statistics, very carefully kept since 1897, show a remarkable increase during the past ten years. About £800 000 worth of bulbs are now exported annually, about 40 per cent of which go to England. There are about 200 export firms for bulbs in Holland, and 2500 growers who do not export directly; the total number of persons engaged in the industry is estimated at 4000. The Dutch bulb growers form a General Federation which numbers about 3000 members divided into 37 groups. The Federation publishes a paper twice a week, organises sales during the season, submits new varieties to a committee of judges and lays all trade disputes before a council specially named for the purpose. The Federation has also organised exhibitions and sent Dutch produce to foreign shows.

Netherlands

There are two other Societies connected with the bulb industry, one protects the interests of exporters, and the other those of growers who do not export.

Preserving the Scent of Violets. — *Revue scientifique*. Paris, Nov. 19, 1910.

The following is a process for preserving the odour of violets when the flowers are no longer fresh:

The fresh flowers must be detached from the stalk and placed in a clean glass jar with ordinary salt, thin layers of the salt and of the flowers being placed alternately. The jar should be completely shut, preferably with a ground glass stopper, and must be kept in a cool place. At the end of fifteen days the perfume will be ready, and may be kept for months: when it is desired to have the scent of fresh violets in a room, the bottle is opened for a few seconds and then closed again.

France

Floriculture in the Ligurian Riviera. (La floricultura sulla Riviera Ligure). — *Agricoltura italiana*, XXXVI, 683, pp. 614-618. Pisa, October 31, 1910.

This article, continued from a previous number, gives an account of the cultivation of the rose and carnation together, a characteristic combination in Liguria in recent years.

Italy:
Liguria

The cost and yield may be regarded as constant after the fifth year of growth, excepting that in the last year the value of the rose stocks has to be added to the returns. At the fifteenth year the following balance may be drawn up for one hectare of land containing about 500 rose stocks and 1600 carnations.

Expenses	6 418 frs. 35
Returns.	12 307 » 67
Total net profit.	5 889 » 32
Annual »	273 » 25

New Method of Grafting. — *L'Agronomie*. Namur, Nov. 1910, No. 48, p. 393.

Belgium

This method consists simply in cutting both graft and stock obliquely, fitting the oblique surfaces closely together and keeping them in place by a small piece of elastic tubing. This should cover the graft entirely, so as to exclude air from the cuts. It enlarges with the growth of the plant, and gradually drops away under the influence of the air, the heat and the rain, so that by the time the graft has taken well it is free.

G. QUINN. Fruit Tree Pruning. (A Practical Text Book for Fruit Growers working under the Climatic and Economic Conditions prevailing in Temperate Australia. By George Quinn, pp. vi-230, Adelaide, Australia, 1910). — *Nature*, No. 2140, vol. 85, p. 2. London.

Australia:
South
Australia

This book, which deals with fruit tree pruning, was written by the Horticultural Instructor of the Agricultural Department of South Australia, for the use of those who cultivate fruit trees under the climatic and economic conditions of temperate Australia.

O. LABROY. Wind-breaks in Fruit Orchards. — *Journal d'Agriculture Tropicale*. Paris, Sept. 20, 1910, No III, p. 286.

United
States:
Antilles

A report on wind-breaks in fruit orchards has been made by M. A. von Hermann to the National Horticultural Society of Cuba.

The fruit growers of California, Porto Rico and Florida have adopted the system of wind-breaks in their orchards and orange groves where M. von Hermann saw some of the finest fruit in the United States.

Fruit trees sheltered by wind-breaks are more vigorous in appearance than those in plantations left open to the weather and to rough or dry winds, and their products are much finer.

Among trees most adapted as wind-breaks the following are recommended: *Eucalyptus* (*E. robusta*, *E. resinifera*) the Filaos (*Casuarina*) and the *Gre-*

villæ robusta. The roots of these may be prevented from encroaching on the soil of the orchards by digging every two years a trench at a distance of 5 metres from the foot of the trees and cutting off all the roots which spread beyond this space, but there is some danger that this method may weaken the trees forming the wind-breaks.

I. ROSSI. **Green Manure in Vineyards.** (I sovesci nei vigneti). — *La Rivista Agricola*. Roma, Nov. 1910, fasc. 123. pp. 424-425.

The efficacy of green manuring has been proved by experiments made in a vineyard at S. Ilario Ligure. It lies on the slope of a hill, and the soil is loam of a clayey-siliceous character. The experiments were begun in the autumn of 1907, with horse-beans, beans, and lupin, but the two latter were abandoned, the horse-beans having given the best results. The following fertilisers were given to the horse-beans:

Italy:
Liguria

Thomas slag	Kgs.	800	per hectare
Sulphate of potash . .	»	100	»
» of lime	»	600	»

The results obtained in comparison with 1907, which year may be considered as representing the normal production before the experiments were tried, were as follows:

Year	Production per hectare:		Composition of product	
	Qs.		Glucose %	Acidity °.
1907	42		16 $\frac{1}{2}$	11 $\frac{1}{2}$
1908	60		17	10 $\frac{1}{2}$
1909	69		17 $\frac{1}{2}$	10
1910	50		17 $\frac{1}{2}$	10 $\frac{1}{2}$

A. MARESCALCHI. **Grapes from the Extremity and from the Base of the Branch.** (L'uva dell'estremità e quella della base del tralcio). — *Il Coltivatore*. Casale Monferrato, Nov. 1910, N. 32, pp. 422-426.

M. Marescalchi made experiments to determine the variation in sugar content in grapes, according to their position on the vine. Analysis gave the following results:

Italy:
Piedmont

Grapes from:	
Extremity of branch	Base of branch
17.5 %	17.7 %
15.2 »	16.3 »
13.0 »	16.0 »
13.3 »	15.0 »
13.2 »	15.0 »
14.0 »	15.0 »
Average: 14.4 %	15.9 % of sugar.

This shows that, given the method of cultivation used (which is described) grapes from the base contain more sugar than those from the end of the branch.

Table Grapes on the Swiss Markets. (Uve da tavola sui mercati della Svizzera). — *Bollettino del Ministero d'Agricoltura, Industria e Commercio*, serie B, fasc. I, Rome, 1910, p. 239.

White table grapes are preferred to black, in Switzerland. The varieties most in demand are: the *Chasselas*, from France, Algeria and Bologna; the French *Servent*, the Swiss *Fendant* from the Valais, the *Trebbiano* from the Abruzzi, the *Colombana* from Pisa and the Spanish *Muscats*.

Next to the Italian *Dolcetto* and *Negretto*, the *Raisin Fraise* (*Uva fragola*) from the Ticino is preferred among black grapes, as well as the French *Olivette rouge* and the Belgian *Gros Colman*, the two latter varieties are very expensive. The hothouse grapes of Almeria and Belgium are very little in request, on account of their high price.

The Belgian grapes are packed in cases lined with wadding, and those from Spain in boxes filled with cork chips.

Vine cultivation in Uruguay. — *Office du Gouvernement générale de l'Algérie*, Nov. 1, 1910.

The *Bulletin bimensuel de la Chambre de commerce française de Montevideo* gives the following information for 1908-1909 on the cultivation of the vine in Uruguay:

	1908	1909
Hectares cultivated	3611	5693
Bearing vines	10 525 882	18 588 692
Vines not yet bearing	4 717 386	4 250 615
	15 243 268	22 839 307
	1908	1909
Total crop . . . Kg.	7 388 562	29 378 340

The consumption of wine in Uruguay at present is more than 400 000 hectolitres, while the wine produced and imported does not amount to more than 260 000 hectolitres altogether. The difference is made up by manipulation of strong Spanish and Italian wines, containing upwards of 16° of alcohol.

The Preparation of Pickled Olives in Seville. (La Préparation des Olives de table à Séville). — *Office du Gouvernement Générale de l'Algérie*. Paris, 1 Nov. 1910.

The varieties of olive chiefly used for the table, are *Gordal*, *Reina*, *Manzanilla*, *Padron*, etc. While green, they are placed in a lye of commercial caustic soda, having a density of about 2% to 2.75% (Beaumé), the vessel being covered with a mat, in order that the olives may remain well immersed. Usually, they are kept 11 hours in the lye, by some makers as much as 14 hours; according to the variety and the ripeness of the fruit. The olives are then washed in clear running water and left for 10 hours; finally, they are put into a solution of kitchen salt with a density of 11°, Beaumé, and remain for one month in this pickle.

Spain

V. THIÉBAUT. Olive Cultivation in the Caucasus. — *Journal d'Agriculture pratique*, No. 47, Paris, November 24, 1910, p. 669.

The Russian Ministry of Agriculture has sent a specialist to study olive culture in Italy, France and Algeria, with the object of improving this cultivation in the Caucasus. In Russia, the olive is cultivated along the eastern shores of the Black Sea, in the districts of Artvine, Batum and Soukhoun. It has decreased in the district of Artvine in consequence of the emigration which followed the conquest of this country. The monks of the convent of Novoi-Afou, near Sankhorim, possess 10 000 olive trees, planted over an extent of 60 hectares. A tree 20 or 30 years old yields about 160 kg. per year and a net revenue of from 30 to 60 francs.

Russia:
Caucasus

About 5 per cent of the olives are pressed for extracting the oil, and the rest are salted and sold at Tiflis and other towns of the Caucasus. The total crop in the Caucasus does not exceed 200 tons and is far from sufficient for local consumption.

The cultivation of the olive has therefore a great future in the Caucasus, where the climate and soil are propitious.

LOSPINOSO. The Trade in Citrus Fruits at the Port of Odessa. (Il commercio degli agrumi nel porto di Odessa). — *Bollettino del Ministero di Agricoltura, Industria e Commercio*, serie D, fasc. V, Roma, 1910.

Odessa supplies nearly all Russia with citrus fruits. The trucks for the conveyance of these fruits are heated in winter and refrigerated in summer. The tariff is very low, and in inverse proportion to the distance traversed. Preference is given to lemons from Messina, especially *Verdelli*, and to oranges from Catania, while in America, the produce of Palermo is held in highest estimation, as in England and Germany. But a suitable warehouse

Russia.
Italy

for citrus fruit is wanting at Odessa. This inconvenience is chiefly felt in winter, when, as the entrance of goods into the town is forbidden by the Russian custom-house after 5 o'clock in the evening, many oranges and lemons freeze on the wharves.

SAWYER. **The Shank-Noo (*Citrus Hystrix*).** — *Agricultural Journal of India*, Calcutta, October 1910.

The Burmese *shank-noo* is the least known member of the familiar group of valuable plants represented by the lime and lemon. The *shank-noo* may be described as a small tree from 15 to 20 feet high, attaining a girth of 2 feet at the base. It has crooked, reddish-brown stems and branches, dark-green, glossy leaves looking like two leaves folded together. It is found wild in the forests of Tenasserim and is cultivated there and elsewhere in gardens. The light-green oil extracted from the rind resembles the oil of the true Bergamot; it has a milder perfume than the distilled essence, but the yield is relatively small and uncertain. The pulp of the young fruit is insipid, besides being thick and mucilaginous. As the fruit matures, the mucilage is replaced by an acid juice which becomes gradually more watery.

The chief use to which the fruits of the *shank-noo* are at present applied in Burma is as a detergent for washing the hair. The ripe fruit is sometimes also employed for the fomentation of painful joints.

C. I. KINMAN. **Citrus and other Fruit Trees at Porto Rico.** (Report of the Horticulturist). — *Annual Report of the Porto Rico Agricultural Experiment Station for 1909*, Mayaguez, 1910, pp. 18-23.

A number of experiments have been made at the Porto Rico Experimental Station on the types of citrus fruits most likely to grow well in the various parts of the island. Certain selected native orange trees, although slow growers, are recommended on account of their excellent produce, and very good results were obtained from the exotic varieties *Thompson Navel*, *Homasassa*, *Parson Brown*, *Centennial* and *Pine Apple*. Trees of *Citrus medica* var. *acida* are frequently found with 400 or more fruits; the *Duncan*, *Marsh Seedless* and *Pernambuco* are the best varieties of the *Citrus decumana* (pomelo).

The rapid growth of the mango-tree (*Mangifera indica*), which reaches a height of at least 6 metres in 5 years, makes it very valuable as a wind-break for citrus fruit plantations.

Apples, pears and plums could never be made to pay in this country, although they grow well enough, nor could bananas and other tropical plants like the *Blighia rapida* and *Eugenia Malaccensis*.

British
India:
Burma

Porto Rico

National Apple Show at Vancouver. — *The Globe*, Toronto, vol. LXVII, No. 18954-18957, Nov. 14, 1910, p. 4.

The first National Apple Show in Canada was opened at Vancouver on October 31 last. There were 287 exhibitors and 3424 exhibits, comprising 194 varieties of apples.

Fruit cultivation has made enormous progress during the past ten years in British Columbia, largely owing to the initiative of Lord Aberdeen, who bought a vast extent of land near Vernon in 1891 and began irrigating and planting it. His example was first followed by Englishmen and then by Americans. Now nearly 100 000 acres (40 460 hectares) are already planted and irrigated at Okanagan; 400 000 trees were planted on 11 000 acres (4 450 hectares) in one district only, and last year these plantations furnished ten truck-loads of fruit. It is estimated that they will yield eventually a net revenue of 800 000 dollars (4 144 000 frs.).

Apples, pears, peaches and plums are among the fruits cultivated, and until the trees are in full bearing, tobacco is grown, especially at Kelowna.

Canada:
British
Columbia

I. R. SHAW. **Variations in Apples** — *Twenty-second Annual Report of the Massachusetts Agricultural Experiment Station 1910*, pp. 194-213, Boston, 1910.

The *Ben Davis* variety of apple is one of those most cultivated in America, and grows equally well from Quebec to Texas, under the most varied conditions of climate and soil. It is more suitable than any other for the study of variation. The Massachusetts Agricultural College, by experiments carried on for some time, has reached the important conclusion that the variability of the apple shows itself chiefly in the shape and size of the fruit, as well as in the quality of its flesh. As regards shape, there is now no doubt that it tends to elongate as it is found further North, this tendency becoming more marked near great expanses of water. Temperature and moisture are perhaps the cause of this change, but precise data are wanting as to their exact action.

United
States

The variations in volume depend on the temperature of the summer; when it is high, the size of the fruit greatly increases. Heat also directly influences the quality of the pulp, and if the mean temperature of March and September is below 60° F (15° C) the flesh becomes acid and dry.

G. E. POWELL. **The Culture of the Pear** — *Fifty seventh Annual Report of the Massachusetts State Board of Agriculture 1909*, p. 305-306. Boston, 1910.

United
States:
Massa-
chusetts

The cultivation of dwarf pear-trees is not much in favour among fruit-growers in the United States, because, as a rule, when selected varieties

are grafted, they yield somewhat inferior produce. The variety known as the "Angoulême pear" is, however, an exception; when grafted on the wild quince (variety, *Anger Quince*) it produces a large yellow fruit of exquisite flavour, much sought after in the market.

The graft should be made at a depth of 10 c.m. to prevent the stem from breaking at the point of insertion, either from the action of the wind, or the weight of the fruit.

The trees should be planted in the proportion of 172 to the acre, and at a sufficient distance to allow of the passage of a horse harnessed for ordinary field-work.

Mulberry Plantations; Number of Mulberry Trees in a certain Area; Experiment on Mulberry Cultivation. — *A General Report of Sericultural Investigations*, Group II, pp. 17-18 (17-40); *The Imperial Sericultural Institute*, 1910. Tokyo and Kyoto.

Japan The results are given of experiments made in Japan on the effect of close or wide plantation on the crops of mulberry trees. The experiments were begun in 1904 with mulberries of the *Rosò* variety on three different plots:

Plot		Area hectare	Distance between rows metres	Distance between trees metres	N. ^o of trees
	a)	0.0445	1.52	0.304	989
»	b)	0.0445	1.52	0.608	461
»	c)	0.0445	1.52	0.912	247

The average amount of leaves gathered in 1906, 1907, 1908 was per annum:

Plot	a)	kg. 495.059
»	b)	» 416.071
»	c)	» 302.271

Taking 100 as the average annual production of the densest section, the relative production of the others is:

Section	a)	distance m.	0.304	100
»	b)	»	0.608	85 %
»	c)	»	0.912	60 »

Experiments on Mulberry Cultivation in Japan. (Mulberry Plantation: Proper Quantity of Manure: Experiments on Mulberry Cultivation). — *A General Report of Sericultural Investigations*, Group II, pp. 18-20 (17-40); *The Imperial Sericultural Institute*, 1910.

Japan The average results obtained, from 1905 to 1909, on plots of 0.101 hectare in extent by manuring mulberry trees with farm manure were as follows:

Manure kg.	Leaves on young branches kg.	Leaves on old branches kg.	Total quantity of leaves kg.
2250	895.46	733.01	1734.16
3750	945.76	913.83	1859.59
4500	1048.18	982.57	2032.75
6000	1061.85	942.00	2003.45
7500	1133.56	966.42	3100.36

If the value of the manure be compared with that of the leaves gathered, it will be seen that in Japan it is the best economy to use 3750 kg. per 0.101 hectare, or 36 534 kg. per hectare. The price of course varies according to locality, but this basis of valuation may be applied everywhere.

Mulberry Plantations; Cutting and Plucking. Experiments on Mulberry Cultivation. — *A General Report of Sericultural Investigations*, Group II, pp. 20-23 (17-40); *The Imperial Sericultural Institute*, 1910.

Experiments on the method and season for cutting and plucking mulberries were begun in 1904 on the Japanese variety *Jumonji*, the branches of which are at 10 cm. from the soil.

Japan

The experiments were carried out on 6 plots:

	Cutting	Plucking
Plot 1 in spring.	once, in spring.	
2 » 	twice, in spring and in autumn, leaving 5-6 leaves at the tips of the branches.	
3 before the fall of the leaf.	once, in autumn, leaving 5-6 leaves at tips.	
4 » » 	twice, in summer, leaving 12-13 leaves; and in autumn, leaving 5-6.	
» 5 in summer	twice, in spring, leaving 5-6 leaves, and in summer.	
» 6 in spring.	twice, in spring and in autumn, leaving 5-6 leaves.	

The average results of the years 1906-1908 were as follows:

	Crop per tree	Crop per tan = 0.099 ha.
Plot 1) kg. 2.883	kg. 1536	
» 2) » 3.123	» 1918	
» 3) » 2.730	» 1501.5	
» 4) » 5.007	» 1666.5	
» 5) » 4.155	» 2275.2	
» 6) » 2.696	» 1432.9	

Generally speaking, the quality of the leaves, the vigour of the plants and the resistance to disease were in inverse relation to the abundance of the crop.

The Carob Crop in Cyprus in 1910. — *Office du Gouvernement général de l'Algérie*. Paris, Nov. 15, 1910.

Cyprus

The carob crops have been excellent in the district of Larnaca (60 000 cantars, 1 cantar = 57 kg.), where grafts are made on a large number of wild trees every year.

At Famagosta the crops were double those of last year, and at Limassol, in spite of the hot winds, they were about 30 per cent above the average. At Kyrenia the yield surpassed that of 1909 by more than 50 per cent, and at Paphos by 60 and 70 per cent.

V. DI MATTEI. Results of an Experiment in Sicily in treating Carob Trees with Chemical Fertilisers. (Risultati di una prova di concimazione chimica su piante di carrubo). — *Il Villaggio*. Milano, 26 Nov., No. 1796, p. 565.

The experiments were carried out at S. Tommaso in the province of Syracuse, in Sicily, on carobs of 20 years' growth, on argillo-calcareous soil.

The experiments were to show:

1) by comparison with a control, the effect of the use of chemical fertilisers alone;

2) the effect of potassic fertilisers, using increasing amounts of sulphate of potash;

3) whether or not, carobs should be manured with nitrate of soda.

In order to answer these questions, 6 groups of carobs, each of 5 plants of equal development, were manured on April 21st 1908 by spreading the fertilisers round the foot of the tree at a depth of about 20 cm., over a surface corresponding in width to the projection of the crown.

The following table gives the manure used for each group:

Number of group	Mineral Superphosphate	Sulphate of potash	Sulphate of Ammonia	Nitrate of Soda
	Kg.	Kg.	Kg.	Kg.
I	—	—	—	—
II	4	1	1	—
III	4	1.5	1	—
IV	4	2	1	—
V	4	—	1	—
VI	4	1	—	1

**Italy:
Sicily**

On the different visits made to the various groups in 1909, a marked increase of vegetation was noticed in groups II, III, IV, V and VI in comparison with I (the control).

On August 30th 1910 the fruits were gathered and the results were as follows:

Number of group	Crop of Carob-beans Kg.	Number of group	Crop of Carob beans Kg.
I	210	IV	350
II	344	V	250
III	354	VI	262

1) The advantages of using complete chemical manure for carobs are clearly shown.

2) Potash has evidently influence in increasing the crop.

3) The effect of potash fertilisers, using an increasing amount of sulphate of potash, is not so clearly demonstrated.

4) It is proved that carob-trees should not be manured with nitrate of soda.

L. BLANC. **Grafted Walnut-trees and their Resistance to Frost.** — *Société de pomologie du Canton de Vaud. Rapport du Comité et de la Commission d'études à ses membres 1909*, pp. 47-48. Lausanne, 1910.

There are two advantages in planting grafted walnut-trees.

1) As they come very late into leaf, they scarcely ever suffer from frost;

2) From the graft, large and good fruit is certain, which is not always the case with those raised from seed.

The planting of grafted trees, according to the Treyve system, is recommended, i. e. grafted at the soil level, and only leaving a small excrescence which gives rise to a straight stem.

The varieties recommended are: *Chaberte, Franquette, Magette, Parisienne, Meylanaise, De Vourey, Gladys*.

While the native walnut-trees were already in leaf, and therefore exposed to the May frosts, the above varieties planted beside them had not unfolded their buds. (Observation made May 10th, 1910).

Almond Crops and Trade in the Malaga Region. — *Feuille d'informations du Ministère de l'Agriculture*. Paris, November 8, 1910.

The annual almond crop of the province of Malaga is about 80 million kg. This province, which formerly took first rank amongst the richest almond pro-

Switzerland

Spain

ducing districts of Spain, has only a secondary place in this culture now, in consequence of the ravages made by bad seasons and cryptogamic diseases.

In Malaga the almond tree is generally planted on stony hill sides. Two distinct varieties are produced, the *malaguena* or *larga* and the *valencia* or *corta*, very flat and more common.

Malaga almonds are mainly sold in the United States and in England.

Yield of Cocoa-nuts per Tree. — (*Queensland Agricultural Journal*, Sept. 1910); *The Tropical Agriculturist*, Colombo, October 1910, vol. XXXV, n. 4, p. 367.

The average yield of cocoa-nuts per tree is usually calculated as sixty nuts per annum; but trees have often been known to produce 100 nuts and even more. There are numbers of trees in Papua from which 100 good nuts were obtained, and as many more left for the next crop. In British Guiana there is said to be a very prolific cocoa-nut palm.

The *Mora Plantation and Development Company* has a cocoa-nut tree near Zamboanga (Philippines) from which 106 nuts were taken at one time and 112 two months later.

Cocoa-nut and Cacao Planting in Java. — *The Tropical Agriculturist*, Colombo, Oct. 1910.

The Dutch Colonial Government has granted to a Ceylon planter a concession of 3 700 acres for the development of the cultivation of the cocoa-nut and cacao.

Among other facilities, he has been granted a maritime tariff not exceeding 25 cents, per 60 kilograms.

Spineless Cactus to be distributed. — *California Fruit Grower*, Vol. XLII, No 1163, San Francisco, Oct. 22, 1910, p. 8.

The Agricultural Department of the United States will distribute in the spring of 1911 about 10 tons of segments of Spineless *Opuntia* (Prickly Pear). These are grown chiefly at Chico in California, and at Brownsville in Texas.

Of the 30 varieties cultivated by order of the Department, 8 or 10 have been reproduced in sufficient quantities to allow of their being supplied to anyone requiring them for experimental purposes.

The zone of growth of these prickly pears or Indian figs is restricted to California, the Coast of Florida, Texas, the region extending southwards from the Texas-Mexico railway, and in S Arizona, where the temperature does not fall for long below 20° F. (6°-7° C.).

Papua.
British
Guiana.
Philippines

Dutch
East
Indies;
Java

United
States

The Cultivation of the Banana in Travancore. (*Agricultural Journal of India*, vol. V, Part. III, July 1910); *The Tropical Agriculturist*. Colombo, Oct. 1910, vol. XXXV, No. 4, p. 309.

The central and northern parts of Travancore have the advantage of two monsoons, and are, therefore, specially suitable for the cultivation of the banana. As far as can be ascertained the species grown is *Musa Paradisiaca*. When the soil is well prepared, pits 3 feet deep and 3 feet across are dug 8 feet apart; an acre contains about 1200 pits. Most of the plantations when established, continue to produce fruit for ten or more years, provided the soil is regularly ploughed, weeded and manured. Fibre can be extracted from the stems, and this industry is not neglected. An acre of banana yields, on an average, about 200 Rupees (1 Rupee = 1.60 Frs.). But the cost of cultivation leaves no profit to the cultivator during the first years. The cultivator derives profit by raising secondary crops such as yams, etc. which cost him next to nothing. Before the cultivation of bananas, the ground should lie fallow some time.

British
India:
Travancore

Bananas in Australia. — *La Quinzaine Coloniale*. Paris. Nov. 10, 1910.

Banana cultivation is gaining importance in all tropical regions, and the Queensland banana planters are doing their best to oust the Fiji island bananas from the Melbourne market, and to replace them with those of their own growing.

Australia:
Queensland

The planters have formed an association to import banana plants from Jamaica, which might begin to yield at from one to two and a half years; the fruit could be delivered at Melbourne in the best condition.

Cassava and Dates in the Punjab. (*Pioneer*, Sept. 29). — *The Tropical Agriculturist*. Colombo, Oct. 1910.

The expert date grower engaged from Basrah has now arrived in the Punjab with 1000 suckers of the best varieties of Persian Gulf dates. These are being planted at Multan and Muzaffargarh.

Experiments with Cassava last year were far from encouraging, owing largely to the ravages of white ants which destroyed the majority of the sets planted, in spite of the measures taken to keep them off. But for the damage done by white ants, a yield of 10 000 lbs. of roots would be obtainable per acre on irrigated land. This would be only half the yield reported in Travancore, where the plant flourishes, and would give a fair profit. But it must be remembered that nothing approaching this crop can be expected, unless some method can be devised of combatting white

British
India:
Punjab

ants. Cassava seems unable to grow without irrigation in this province, and it is very doubtful if it can profitably be substituted for any of the existing crops.

P. PAUZOLS. **The Preservation of Fruit.** (La Conservation des Fruits). — *L'Ariège Agricole*. Foix, Nov. 1910, N. 11, pp. 337-339.

This paper deals with the best time to gather fruit, its storage, and its arrangement on latticed shelves.

France

The varieties of pears which keep best are; *Caré, Colmar, Nélis, Beurré d'Hardenpont, Passe-Colmar, Passe-Grassane, Doyenne d'hiver*, etc.

The best keeping Apples are; *Royale d'Angleterre, Reinette du Canada, Calville de Manssion, Calville rouge d'hiver, Reinette grise, Reinette dorée*, etc.

It is stated that the only way to dry fruit, if damp, is to leave it for some time in the air, and to employ no other means for drying it.

Fruit, Flower and Early Vegetable Trade in Germany. *Feuille d'Informations du Ministère de l'Agriculture*. Paris, Nov. 15, 1910.

Germany

In consequence of the enormous increase in the annual consumption of early produce of all kinds, worth about 170 millions of marks, more than half of which is supplied by foreign countries, German farmers are agitating for a tax to be put on certain farm, orchard and garden produce, such as vegetables, fresh flowers, and milk products.

The export and import trade of Germany in flowers, fruit and early vegetables for three years was as follows:

	Imports	Exports
1906	33 900 000 Marks	7 500 000 Marks
1907	102 800 000 »	4 200 000 »
1908	94 500 000 »	2 500 000 »

German farmers have recognised the great possibilities of this trade, and want to extend the cultivation of fruit trees. The last fruit tree census, taken in Germany ten years ago, gave the following figures:

52 332 000 apple trees;
69 436 000 plum trees;
25 116 000 pear trees;
21 548 000 cherry trees.

While the industry of early produce would develop in consequence of protection, every effort would be made to create a market in certain foreign countries, such as Holland, Norway and Sweden. The *Bund der Landwirten*

is actively studying these various questions, and the fact that it has undertaken the campaign is evidence of its desire to obtain tariff advantages.

The following quantities of fruit were sent into the country in 1909:

82 324	tons from Italy
39 068	» Austria
28 117	» Switzerland
19 000	» France
10 189	» Spain

In addition to this, grapes and citrus fruits were imported from Italy and Spain. It is obvious that the increased consumption of fruit in Germany mainly benefits Spain and Italy.

Exportation Facilities for Spanish Fruits, Flowers and Kitchen Garden

Produce. (Los exportadores de frutos). — *Revista de San Isidro*. Barcelona, Nov. 5, 1910.

In order to encourage the cultivation of fruit, flowers, vegetables and kitchen garden produce, producers and exporters have been exempted from paying the industrial tax, in response to a petition presented to Government by the Institute of San Isidro. Landowners, farmers and those holding farms on the metayage system benefit equally by this decree.

Spain

Exports of Fruits and Plants in S. Australia. — *Journal of Agriculture of South Australia*. Adelaide, 1910, N. 2.

The fruit production of South Australia continues to develop, as the following figures of the exports from Adelaide in August will show:

Australia:
South
Australia

Oranges	37	cases to London
	432	» New Zealand
	16	» Hamburg
Lemons	160	» » New Zealand
Dried fruits	331	packages to S. Africa
Apples	189	cases to India
Preserved fruits	82	packages to India.

L. BR. The Transport of Fresh Pine-Apples packed in Peat and Maize-husks. (Transport des fruits d'ananas dans la tourbe et la balle de Mais. — *Journal d'Agriculture tropicale*, Paris, Octobre 1910. No. 112, p. 317.

An attempt has been made to export to England from the Cape, and from Natal, fresh pine apples packed only in pulverised peat. More recently

experiments have also been made with pine-apples from the Kamerun and the Togo.

This method of packing dispenses with refrigerators, and thus decreases the cost of transport. The results hitherto obtained have been very satisfactory and the method will allow of good profits being made.

In Natal, dried husks of maize are preferred to peat. The isolating and absorptive properties of maize-husks, together with good ventilation of the fruit during the voyage, insure their travelling better than if they were placed in cold chambers.

Forestry.

BUCHET. **The Communal Forests of Lausanne, Switzerland.** (Réunion d'été de la Société Vaudoise des forestiers). — *Journal forestier Suisse*, 61 année, n. 11, pp. 248-250 (347-251). Berne, November 1910.

The total area of the communal forests of Lausanne is 1606.77 ha.; of which 1512.65 ha. are systematically cultivated, and 94.12 ha. are treated as parkland.

Switzerland

The number of trees with a diameter exceeding 18 cm. at 1 m. 30 from the ground, with a cube of 541 068 m³ has been computed at 511 541. The estimated yield has been calculated at 10 140 m³.

In 1909, 11 476 m³ of wood were sold; 6 246 m³ for fuel; and 5 230 m³ for other purposes, this includes the produce of the park-lands.

In the systematically cultivated forests the total cube of timber represents 46 % of the whole amount of wood.

Average price of timber	26.69 frs. per m ³
» fire wood	14.26 »

The receipts are 150.40 frs. per hec. for the sale of wood alone.

The net return is 109.60 frs. per hec.

Expenses amount to 43.07 frs. per hec.

The latter represent 28 % of the total receipts and are apportioned as follows:

Administration, superintendence	30 %
Lumbering expenses	32 »
Cultivation	15 »
Roads and streams	19 »
Various	4 »

The net total of the produce, including that of the parks, amounts to 166 883 frs.

The Petchora Forests (Russia). — *L'Echo forestier*, Paris, No. 1918, October 30, 2910, p. 341.

The Russian Forest Administration has been making a study of the splendid unexplored forests in the basins of the Petchora, and other rivers of the Ourals. The problem of transporting the wood presents great difficulties in the utilisation of the forests, because it can only be floated towards the North by the Petchora. It might be directed towards the valley of the Kama, but the systemisation of the canal between the two valleys would require too great an outlay.

Russia

The French Colonial Forests. — *Revue des Eaux et Forêts*, T. XXXIX, No. 22, pp. 698-700, Paris, Nov. 1, 1910.

There is an immense wealth of forest in all the French Colonies. In French Guiana, for instance, the *Mimusops Balata*, common to the whole of Guiana, grows to a height of 30 metres; its fine red wood is in much request for cabinet-making, the more so because it is not affected by insects. New Caledonia, like Australia, has a characteristic tree, the *Niaouli* (1), which is said to rival the Eucalyptus in its hygienic properties.

French
Colonies:
Guiana
New
Caledonia

Generally speaking, the natural vegetation of the island may be divided into damp forests and dry forests. The damp forests are similar to those found all through the tropics, and cover nearly the whole of the high tablelands of New Caledonia. The dry forests are those of the *Niaouli* tree, which somewhat resembles the oleander. It sends forth abundant shoots when cut. The wood is used for building purposes, and the young shoots, when infused, make an agreeable substitute for tea.

C. S. HAYTER. **Tree Growing in the Zwaartkop Native Location, Natal.** — *The Natal Agricultural Journal*, Vol. XV, No. 4, pp. 460-467, Pietermaritzburg, Oct. 1910.

The growing importance of the reforestation problem in Natal accounts for the works which are being conducted by the Natal Native Trust in the experimental forests of *Eucalyptus*, *Quercus*, *Pinus*, *Casuarina*, etc., at Zwaartkop.

South
African
Union:
Natal

(1) The *Niaouli* (*Melaleuca viridiflora*) is a Myrtacea and is found all over New Caledonia. The hard wood is used by wheel-wrights, and the leaves, when distilled, yield an oil something like cajeput oil. [Ed.].

The *E. amygdalina* and *E. obliqua*, of the genus *Eucalyptus*, are rapid growers, attaining a height of 15 metres and a diameter of at least 20 cm. in from five to seven years. The *E. botryoides*, *E. pilularis*, *E. saligna* and *E. sideroxylon*, yield a wood greatly appreciated for compactness and durability. The *E. tricolor*, on the other hand, which grows in spare shrubs, and the *E. microcorys*, which is killed by winter frosts, give very poor results.

The *Populus alba* grows well in low, damp localities where no other tree would thrive, and in two years reaches a height of 4.50 metres. The *Cupressus lusitanica* and the *Pinus pinaster* yield excellent timber and grow rapidly, but as they are extremely inflammable, in plantations they should be mixed with other trees less liable to take fire.

Ch. A. SIDMAN. **Methods Adopted by the United States Government to Combat Forest Fires.** — *Scientific American*, Sept. 17, 1910.

United
States

In addition to systems of signals, look-out towers, etc., the Forestry Department has put up 4800 miles of telephone wires to facilitate forest surveillance, so that bands of workmen may be sent to districts where fires have broken out with as little delay as possible. The method adopted for fighting the flames is always that of isolation by every possible means. It is stated that 50 per cent of the fires occur in the neighbourhood of railways, and it is suggested that measures be taken for protection against the sparks issuing from the engines.

Considering the annual increase in the value of forests, the sums set aside for their maintenance should also be progressively increased. The writer of the article considers an area of 100 000 acres (about 40 400 hectares) too much to entrust to the care of a single guard. In Germany and in several other European countries each forest guard is responsible for only 1000 acres (404 hec.).

The writer observes that if the destruction caused by forest fires has hitherto been limited to 1.80 per cent of the total forest area, it is certainly owing to the effective organisation of surveillance and the adoption of rapid means of communication.

F. A. SILCOX. **Proposed Method for Fighting Forest Fires.** (How the Fires were Fought). — *American Forestry*, Vol XVI, No. 11, pp. 631-639, Washington, Nov. 1910.

United
States

The writer proposes the following measures for the location, and control of forest fires; especially in the case of State forests, basing his conclusions on a close study of the recent fires in America:

- 1) A suitable system of ridge and steam trails extending throughout

each forest, with an 18-in. tread and 8-foot clearing. The trails should be from 200 to 400 miles long, for forests of 1 000 000 to 2 000 000 acres, and the necessary expenditure would be between 300 and 400 frs. per American mile (1609 m.). In mountainous districts there should be valley trails and trails on the mountain tops.

2) A system of well selected look-out points, so coordinated as to give primary control of all districts, for locating fires.

3) A main system of telephone lines with tributaries to the look-out points.

4) A supply of pack-horses equipped with pack saddles, to be used for building trails, and for carrying fire supplies when necessary.

5) Tool depots at strategic points throughout the forest, each furnished with mattocks, saws, axes and shovels sufficient for ten men.

6) Patrols of 10 to 20 men on heavily timbered areas, at the rate of at least one man to 30 000 acres, and one man to 50 000 or 60 000 in more open parts.

WILLIS L. MOORE. **Influence of Forests on Climate and Floods.** — Gov. Printing Office, Washington. *Scientific American*, Oct. 29, 1910, p. 334. New York.

A report by Willis L. Moore, chief of the Weather Bureau, states that the observations of the Bureau show that forests have no influence on the rainfall or on the severity of floods. The records of the Bureau do not indicate any permanent decrease in the rainfall of any part of the United States. Observations made at New Bedford, Mass., from 1814 to 1908 show that the average annual rainfall for the first 50 years was 46 inches (1168 mm.), and that this increased to 47 inches (1194 mm.) during the last 45 years, although the district had been largely deforested in that period.

It is generally thought that forests act as a sort of sponge to retain water, but Mr. Moore agrees with Prof. Abbe and many engineers and meteorologists, that a cultivated, permeable soil is quite as good an absorber of the rainfall as a forest, provided the soil be ploughed to a depth of 8 inches.

Observations in the Seine basin in France, during two and a half centuries, show that in spite of deforestation, the average height of the floods has been continually decreasing; and in Austria the studies by the Hydrographic Bureau on the history of the Danube floods over a period of eight hundred years, show that deforestation has had no effect on the frequency or height of the floods.

PAUL BUFFAULT. **Forests and Floods.** — *Revue générale des Sciences*. Paris. Nov. 15, 1910, pp. 894-902.

The recent rising of the Seine has called attention to the question of deforestation. There scarcely seems reason to believe that the Seine floods

United
States.
France.
Austria

France

are due to deforestation: 18.5 per cent of the territory of the Seine basin being still covered with forests.

Yet deforestation certainly had some part in the flood of 1910. The valley of the Grand Morin, an affluent of the Marne, is formed of lands that are comparatively porous, but during heavy and continuous rains like those of last January, the soil becomes so saturated that the water flows off the surface just as over non porous land, forming veritable torrents.

The mass of water thus collected, reaches Paris in a day and a half, causing a rise of 40 cm. Now, it has been pointed out by M. de Villemereuil at the last Congress of the Scientific Associations, that the Grand Morin, which with its affluent the Aubetin, drains the unwooded part of Brie, is noted for its sudden and excessive risings, while the other affluents of the Marne, which collect the waters of the Northern and *more wooded* part, are much more even in their course. Obviously, the reforestation of a part of the Grand Morin valley would increase the saturation capacity of the soil and make these risings less disastrous.

The question is dealt with at length in this paper, reference being made to the discussion at the Milan Congress in 1905, and to the statement of hydraulic engineers to the effect that "a definite verdict can not yet be given on the influence of forests on water courses."

Dr. K. RACKMANN. The Problem of Reforesting Dunes. Manuring Experiments with Scotch firs on the Kurische Nehrung, Prussia.

Kieferndüngungsversuch auf den Dünen der Kurischen Nehrung). — *Naturwissenschaftliche Zeitschrift für Forst- und Landwirtschaft*, 8 Jahrgang, Heft. II, pp. 513-522, Stuttgart, November, 1910.

Sand dunes are a constant danger to the land near them, and this danger is greater along the coasts of Prussia than elsewhere; the most extensive sand dunes of Europe are to be found here, rising sometimes to a height of 40 metres.

The attempts hitherto made to stop this danger by wooding the dunes have given anything but satisfactory results from the point of view of forest economy, although the special aptitudes of certain plants have been brought to light by this means. The few plants which take root in the sand grow miserably into a kind of twisted brushwood, with stunted trees and leaves all turning yellow.

In the spring of 1908 at the suggestion of the Potash Manures Syndicate of Königsberg, an experiment in manuring was begun on the Schwarzerburg, one of the most characteristic dunes in the neighbourhood of Rossitten.

The land chosen for the purpose was divided into 5 plots, each 10 m², and 9 holes were made in each plot, 4 young pine trees being planted in

each hole. The first plot was kept as control, the other 4 being manured with equal quantities of nitrogenous substances and different quantities of potash and phosphorus.

The following table shows the quantity of manure put into each hole:

Plot	Thomas Slag gr.	Kainite gr.	Salts of K. at 40° gr.	Dried blood as nitrogenous manure gr.
I.	—	—	—	—
II.	2.5	5.0	—	3.0
III.	5.0	7.8	—	3.0
IV.	7.5	10.0	—	3.0
V.	7.5	—	4.0	3.0

The good effects of the manure were soon shown in a healthy luxuriance of branches and leaves in sharp contrast to the yellow growth on the neighbouring dunes.

At the end of 15 months the plants on the various plots yielded an average weight of 21.3; 50.75; 37.88; 36.88; and 34.75 gr. respectively. These results are in favour of a phosphoric-potash fertiliser; an excessive quantity of which, like that in plots III and IV, giving bad results, probably on account of the caustic action of the Kainite.

Even in regard to the distribution of weight amongst the different organs of the plant, the second plot was in the best condition; the development of the leaves was remarkable, the natural consequence of which in the second year would be an increase of assimilation and a rapid growth of organic matter. The number of buds in the second plot was nearly double those on the unmanured pines, and though the length of the trunk was not much increased, the radical system was well developed without prejudice to the leaves or other organs of the plant.

The following table gives the total results of the chemical analysis of the roots, trunks, leaves and shoots:

Plot	I	II	III	IV	V
Fresh substance examined					
gr.	86.0	203.0	149.0	147.5	138.5
Ash., gr.	1.093	2.1536	1.464	1.533	1.476
Percentage of ash. . .	1.21	1.02	0.96	1.04	1.04
Percentage of potash in					
ash.	21.475	22.235	27.195	33.378	25.82
Potash, gr.	0.237	0.480	0.387	0.528	0.391
Percentage of potash in					
fresh substance . . .	0.277	0.239	0.260	0.358	0.268

As will be seen, the plants of the second plot had the highest wood content in the fresh state, and also assimilated a larger quantity of potash.

The good results obtained by this manure and its relatively low cost (8.90 marks per hectare) are two factors which render this method of cultivation practical and efficacious for the rewooding of all light and sandy soils.

Reforesting of the Karst, District in Carniola. (Bericht der Aufforstungskommission für das Karstgebiet des Herzogtums Krains für das Jahr 1909). — *Centralblatt für das gesammte Forstwesen*, XXXVI J. II H., pp. 513-516. Vienna, Nov. 1910.

Austria:
Carniola

In consequence of the application of the law of March 9th, 1885 (L. G. Bl., No. 12) for the reforesting of the Karst, in Carniola, 78.64 hectares were replanted in 1909 with 532 000 Austrian pines, 4000 Norway spruces, 14 000 fir trees and 52 000 alders. The cost was 91.25 frs. per hectare and 11.56 frs. per thousand plants.

More than 1 260,000 Austrian pines, 66 000 Norway spruces (*Picea excelsa*), 7200 larches, 1000 Weymouth pines and 3000 alders were necessary for afforestation, the cost price of these was 10.22 frs. per thousand plants.

The improvement of 11.6 hectares of old forests of Austrian pines by interplanting them with valuable forest trees required 41 000 Norway spruces 3000 larches, 11 600 oaks, 2150 maples and 300 beeches, at a cost of 58 frs. per hectare and 11.18 per thousand plants.

At the end of 1909 the works of reforestation stood as follows.

Entered on the Land Survey Register:

For reforestation	hec. 3945.10
Rewooded	» 2682.52
To be rewooded	hec. 1262.58

Finally, 264 applications have been granted, under certain regulations, for grazing cattle on reserved lands.

D. W. MAY. Reforesting Experiments at Porto Rico. (Forestry). — *Annual Report of the Porto Rico Agricultural Experiment Station for 1909*, pp. 12-13. Mayaguez, P. R., 1910.

Porto Rico

At Porto Rico plantations require to be protected from wind and sun, and the tendency is therefore to cultivate coffee in the shade. The plants adopted for this purpose are leguminous trees, which have besides the advantage of enriching the nitrogen content of the soil.

There is a great deal of rewooding to be done on the deforested areas, which have become almost sterile and valueless. The greater number of useful species will not grow on these now sterile lands where plants are dried

up by the sun. Among the few leguminous plants which may succeed is the *Pithecolobium* sp.; among fruit trees the mango (*Mangifera indica* L.), and mahogany. The eucalyptus would probably do well; the only difficulty would be to grow it from seed: but experiments suggest that the plant could be grown from slips.

H. BADOUX. **Forest School Nurseries in the Canton of Vaud in 1909.** — *Journal forestier suisse*, 61st year, No. 11, pp. 240-244. Berne, Nov. 1910.

In a report read before the Foresters' Association of Vaud on September 6th, 1910, H. Badoux stated that the forest school nurseries which the Association had instituted had reached their fifth year of existence at the end of 1909. The growth of these nurseries has been as follows:

Switzerland:
Vaux

Year	Number	Extent ares	Seed Sown kg.	Plants pricked out	Plants transplanted in nursery	Number of pupils
1905	24	118	—	—	abt. 120 200	—
1906	36	193	—	48 650	240 600	780
1907	42	193	166	114 155	337 400	950
1908	40	213	115	85 960	269 400	850
1909	41	235	104	82 000	271 800	920
1910	45	abt. 250	—	—	—	abt. 1 000

The plants distributed in 1909 were in the following proportions:

Resinous trees (Norway spruce, Scotch fir, etc.). 71 615 (or 87.5 %)
 Deciduous trees: (alder, ash, beech, etc.) . . . 10 355 (or 12.5 %)
 The proportions of those transplanted in the nurseries being:

Resinous trees (epicea, larch, etc.) 237 620 (or 87.4 %)
 Deciduous trees: (beech, ash, etc.). 34 220 (or 12.6 %)

SCHWAPPACH **Use of Fertilisers in Sylviculture.** (Die Verwendung des Düngers im forstlichen Betriebe. VI. Kongress des Intern. Verbandes forstlicher Versuchsanstalten in Brüssel, 1910). — *Centralblatt für das gesamte Forstwesen*, 36 J., 11 H. 511 (506-512). Vienna, Nov. 1910.

The main points of this important report may be summed up as follows:
 1) Manuring is of great economic importance in managing extensive forests, because by its use, waste lands may be advantageously wooded and areas that are only sparsely wooded may be made more productive.

Germany

2) In coppices manure is advisable only for re-plantings, especially when the surface of the soil is exhausted, or for the better utilisation of accumulations of humus.

3) Fertilisers produce no effect on middle-aged or old trees.

4) The economic use of sewage and night-soil in forest plantations is a question to be studied; it appears that night-soil has a good effect on saplings.

5) The most important problem in the use of manure in extensive forest plantations is how to apply a cheap, slow acting, but not necessarily strong nitrogenous fertiliser.

6) With this in view, the following methods of manuring have been tried:

a) a preliminary cultivation of lupins before plantation, and dressing with peat or other organic mould when preparing the holes for planting;

b) a simultaneous cultivation of lupins and clover, mulching the ground with dead leaves, and the stalks and leaves of lupins and potatoes, and interplanting *Pinus rigida*, *P. montana*, *Robinia pseudoacacia* and *Alnus incana*;

c) using super-phosphate of ammonia, ammonium sulphate, Chile salt-petre, peat composts, or other material rich in humus, after plantation.

7) After plantation, concentrated nitrogenous fertilisers should not be used, except to tide over critical periods in the development of newly planted trees.

The writer then describes an experiment made with the *Pinus rigida* mixed with *Pinus sylvestris*: the latter by the end of ten years suffocates the former which gradually forms a fertilising mould.

K. THALER. **Oak interplanted with Beech in Woods.** (Bemerkungen zum Ueberbau und Unterbau-Betrieb). — *Allgemeine Forst- und Jagd-Zeitung*, 86 J., pp. 389-400, Frankfurt am Main, Nov. 1910.

The excellent results obtained in German forests generally, and in those of Hesse on the Rhine in particular, are recorded and it is stated that in future oaks will have an undergrowth of beech.

Germany:
Rhine
Hesse

Apart from the advantages of this interplanting for sheltering and strengthening young trees, it is the best possible way to grow oak trees with straight round trunks clear of branches up to a height of 10 metres.

P. DE COULON. **Oaks in Rumania.** — *Journal Forestier Suisse*, 61st year, No. 11, pp. 229-231. Berne, Nov. 1910.

Rumania

There are four varieties of oak in Rumania: the *sessiliflora*, *pedunculata*, *conferta* and *cerris*. Each of these varieties requires a different exposure, so that they are seldom found growing together.

The restocking of oak woods is easy in Rumania; every five years there is a good crop of acorns, and in the following spring all the gaps in the undergrowth are filled up. The young growths are so vigorous that they are not affected by the surrounding undergrowth.

In years in which acorns are plentiful, the Forest Administration allows pigs to feed in the forests for a certain period, closing the forests again before the fall of the last acorns, which are the best for seed. By this means, the Administration ensures both a gain and the preparation of the ground for sowing, with the suppression of early and inferior acorns, using only the best as seed.

The writer has observed in the oak a faculty for repressing a rival tree growing up against its trunk. The bark swells at the rubbed places forming a thick lip on either side of the rival, thus keeping it at a certain distance.

The timber of *Quercus conferta* is slightly superior to that of the other species. *Quercus cerris* is considered useless both for building and for cooper's work.

G. LAPIE. **Cork-oak Forests of the Djurjura Kabylia in Algeria.** (The Cork-oak Forests. — *Revue des Eaux et Forêts*, t. II, No. 22, pp. 673-682, Paris, Nov. 15, 1910.

Forests of cork-oak cover, or used to cover, according to living witnesses, about 22 per cent (nearly 130 000 hectares) of the total area of the Djurjura Kabylia in Algeria. This tree occasionally grows at an altitude of 1300 metres, but the greater part of the forests composed exclusively of cork-oaks lies at an altitude of less than 1000 m. in northern Kabylia, where the annual rainfall exceeds 800 millimeters. The most favourable altitude seems to be between 600 and 800 metres.

Algeria

The following conditions prevail in the districts where the cork-tree grows at its best:

a) an annual average temperature varying between 14° and 17° C., the minimum never being below 5° C. The tree could stand, apparently, much lower temperatures, but the heavy snows of cold regions seriously damage the top;

b) a rainfall of 800 millim. to 1 m. (1000 millim.) and a relative atmospheric moisture of little less than 60 per cent during the driest month of the year. It is generally admitted that the necessary annual minimum of rain is not less than about 600 millim., varying a little according to the moisture in the atmosphere;

c) a sandy soil or rather a loam, deep and slightly moist, but not wet.

Under the light cover of the cork-oak forest there is generally a high, mixed underwood, in which the *Erica arborea* L. grows plentifully, forming a dense bush 2.50 to 3 m. in height; here and there emerges the *Arbutus*

Unedo L., and throughout the underwood are clusters of *Phillyrea latifolia* L., *P. media* L., *Rhamnus Alaternus* L., *Viburnum Tinus* L., and frequently, below these, the *Myrtus communis* L., attaining about $\frac{2}{3}$ of the height of the rest. Under the triple screen formed by the forest, the heather and the myrtle, the ground vegetation is smothered except in the glades.

The cork-oak has many animal parasites, but cattle and man have done more than anything else to ruin these forests; 45 000 hectares, or about one third, of the original forest are still in fairly good condition; the rest is sinking rapidly into decay.

G. AIKEN. **Norway Spruce (*Picea Excelsa*) as a Forest Tree.** — *Sixth Annual Report of the State Forester. Fifty-seventh Annual Report of the Secretary of the Massachusetts State Board of Agriculture*, pp. 219-220. Boston, 1910.

Remarkable results have been obtained by the plantation of three-year old plants of Norway spruce (*Picea excelsa* Link) at the rate of 1685 per hectare. At the end of 32 years, four average trees had the following dimensions:

Height	17.3—21. 9 metres
Diameter of base . .	0.28— 0.41 »

These four trees gave two steres (cubic meters) of timber for wood paste, which yielded 556 kg. of the dry product.

At the present price of 16.73 frs. per stere, the total yield per hectare would thus be 14 225 frs. If the value of the land be estimated at 63.73 frs. per hectare, and an equal sum be added for the plantation, plus compound interest and taxes, the total capital employed may be estimated at 830 frs. per hectare, so that the total yield for 32 years would be 13 295 frs. per hectare, or 401 frs. per annum.

These plantations were made on hill sides, in a poor, sandy soil, unfit for cultivation, which was yielding only 6.37 frs. yearly per hectare as pasture.

One of the main advantages in Norway spruce is that the whole of the tree can be used for wood paste.

JÜRGENS. **The Larch and other Conifers interplanted with Beech.** (Ueber Nachbesserung der natürlichen Verjüngungen und Forstkulturen). — *Allgemeine Forst- und Jagd Zeitung*, 86 J., pp. 400-402. Frankfurt am Main, Nov. 1910.

The larch is one of the best trees to use for filling gaps in young beech plantations (1 m. in height) on account of the rapidity of its growth when young and the quality of its timber. Young trees of from 2 to

3 years are recommended. But the tree is liable to attack by *Peziza Willkommii*, and the resistance of the Japanese variety (*Larix leptolepis* Hort.) has not yet been satisfactorily established. The writer therefore suggests that it should be replaced by quick-growing American conifers, such as the Douglas fir (*Pseudotsuga Douglasii* Carr.) and the Weymouth pine (*Pinus Strobus* Linn.), which should be planted at intervals of at least 1.40 or 1.50 m.

The Norway spruce, however, is still the tree most frequently used for filling up beech plantations, on account of the ease with which it can be planted and the rapidity with which it fills up the empty spaces, but it offers little resistance to the wind, and is easily attacked, in good soils, by red rot.

The Scotch fir (*Pinus sylvestris*) is the best plant for empty spaces of more than 0.2 hectare.

E. O. RASSER. **Cultivation of the Poplar in Argentina.** (Argentinische Nutzhölzer). — *Der Tropenpflanzer*, 14 J., N. 11, pp. 596-598. Berlin, Nov. 1910.

The natural scarcity of wooded lands in Argentina, and the excessive utilisation of existing forests, especially those of *quebracho*, occasion the greatest difficulty that Argentine settlers have to contend with, *i. e.* lack of timber. As a remedy the poplar has been introduced with success. The oldest and most prosperous poplar plantations lie in the district between the Rivers Ibicui and Uruguay and the Brazo Largo Canal. The plantations are made as follows: the virgin soil, which is very fertile, is first divided by ditches 1 to 2 metres wide and 0.50 m. deep. The grasses are then mown or dug in and poplar slips are planted at the rate of 2000 per hectare.

Argentina

The grass is cut three times during the first, and twice the second year. In spring the plants are pruned, and the cuttings sold or utilised for other plantations. In two years the trees reach a height of 9 or 10 metres.

Gaps, produced by rats which gnaw the bark and ruin the plants, have constantly to be filled; dogs are used for destroying the rats.

The trees are generally felled at the end of 8 years, and the trunks sold on the spot, at prices ranging from 8.13 to 9.75 frs., which gives a revenue of 16 260 frs. per hectare, from which 1083 frs. have to be deducted for actual expenditure.

There are State lands in this district worth from 65 to 86.70 frs. per hectare, and private lands worth from 81.30 to 108.40 frs.

L. LAURENÇONT. **The Japanese Maple.** — *Bull. de la Soc. d'Hortic. et de Vitic. d'Eure et Loire*. Chartres, T. XXVI. Octobre 1910, No. 22, pp. 427-429.

The Japanese maple ranks high among small trees with coloured foliage. In the neighbourhood of Paris, it forms little bushy shrubs with slender

France

branches, and the deeply cut leaves are highly decorative, ranging from golden yellow to dark red. These maples are very exacting as to soil, which must be light and somewhat moist; heavy soils do not suit them at all.

There are many varieties: *Acer japonicum*, *Acer japonicum versicolor*, *Acer japonicum filicifolium*, *Acer japonicum album*, *pictum*, *sanguineum*, etc.

The Japanese maple is grown either singly on lawns, or in groups of 3 to 5 of different varieties to obtain attractive colour effects.

Rubber Yield in Jamaica. — *The Journal of the Jamaica Agricultural Society*, vol. XIV, N. 10, Oct. 1910, p. 377.

Jamaica

Experiments made in several parts of Jamaica on the tapping of rubber trees continue to give good results. At St. Mary, trees between 7 and 8 years old have given 11 ounces (312 gr.) of rubber each, and one tree between 11 and 12 years old gave 2 lbs 1 ounce (936 gr.).

At St. Thomas-ye-East, at an altitude of 390 metres, trees grown from seed in September 1903 gave yields of 9 ounces (255.6 gr.) each. At Portland, 21 trees which had yielded 4 lbs 13 ounces (2 kg. 185) of dry rubber in May and June gave 6 lbs 10 ounces (3 kg. 008) in August and September. It has still to be determined how many times a year a tree may be safely tapped.

The *Castilloa* rubber trees grow well and quickly in Jamaica, both on poor and rich soils, and give satisfactory yields.

State Regulation of Rubber Planting in Cochin China. — *The Board of Trade Journal*, London, Nov. 24, 1910.

French Indo-China

The Government of Cochin China are developing the rubber industry. New regulations concerning grants of so-called "red earth" lands have lately come into force. In the provinces of Tâquinh, Thadaumont, Biênhoa, and Baria, concessions are now only granted on express condition that the lands are used for rubber planting.

The holder of a concession must, each year, plant at least one-tenth of his holding, if less than 500 hectares, and one-twentieth if more, with rubber trees, so that at least one-half of the holding must be under rubber cultivation within ten years. Each hectare must be planted with not less than 120 trees. The planter only becomes absolute owner of his concession when half his land is planted with rubber.

C. HARRIES. **The present State of the Chemistry of Rubber.** — *Revue Scientifique*, Paris, Nov. 5, 1910, pp. 580-587.

Austria

In a lecture given at Vienna on March 12th, 1910, this subject was dealt with under 5 heads: origin and treatment of rubber, its colloidal nature, chemical constitution, analysis, and synthesis,

Rubber is carbide of hydrogen optically inactive, the decomposition products of which, and especially their percentage, may be of great importance in the establishment of its value from a commercial point of view.

It seems that the rubber which furnishes a large quantity of levulose aldehyde is better than that which gives little.

None of the existing methods for determining the quantities of rubber and guttapercha are really satisfactory and it would be well if an independent commission of chemists were to make experimental examination of the analytical methods in use and decide which give the best results.

Mr. Harries describes his experiments and his success in the synthesis of rubber, but the data have a purely scientific interest.

Tapping Rubber Plants. — *Gummi Zeitung*. Berlin, Nov. 25, 1910.

The following practical notes for tapping rubber are taken from an article in the *Ceylon Observer* by Mr. Tisdall, the well-known rubber planter, on the tapping of rubber:

Minimum circumference of trees to be tapped: 45 cm., at an average height of 1 metre from the ground, except in the case of trees which are not well grown, but older.

Method of incision: for trunks large enough, partial incision of a quarter of a circle, and for slighter trunks a half-spiral incision to be repeated exactly on the other side of the trunk as soon as the rubber begins to flow more slowly.

Regulation of tapping: local climatic conditions, must be taken account of, but, generally speaking, the best system is to tap the plant every other day.

Variation of yield: the yield is less in Ceylon during the dry season, and for a very short time during fructification. The plants give the best yields during the four months preceding their winter period, but in damper localities, the greater part (2/3) of the production is obtained between July and December.

Production according to density of plantation: crowded plantations undoubtedly give the best yields after the first, and perhaps even after the second renewing of the bark, but after that, plantations which are more sparsely planted yield better, because the bark is renewed more rapidly and continuously where they have more light and air. More than 100 trees per acre (1 acre = 4046 m.) should never be planted, except on declivities.

Renewing of the bark; the first bark is renewed within two years, the second in three, or, in crowded plantations, in four years; much depends on the way in which the bark is removed, the renewal period being shorter when only slight incisions have been made.

Ceylon

Number of incisions: this depends upon the instrument used, and the ability of the workman; fewer incisions should be made on renewed bark. The knife used in Ceylon has a device for regulating the depth of the incision. A workman can collect the rubber from 150 plants, with 8 incisions, and from 200 plants with 6 incisions each.

The best time to collect the yield is from 5 in the morning to 2 in the afternoon, and the most suitable vessel to use for catching the liquid is the shell of the cocoa nut.

Sodium Nitrate as Fertiliser for Rubber. — *The Indian Agriculturist*, vol. XXXV, N. 10, pp. 308-309. Calcutta, Oct. 1, 1910.

Hawai Experiments in Hawaii show that the use of sodium nitrate as a fertiliser for rubber plants, increases the flow of latex and accelerates the coagulation of the rubber.

A group of five trees at Tantulas gave 0.9 ounces (about 25 gr.) on the three days preceding the nitrate dressing, and 1.3 ounces (about 37 gr.) on the three days following it. The plants were about 27 cm. in circumference and were manured each with half a pound of sodium nitrate.

Plumerias and other South American Plants producing good Rubber. — *La Quinzaine Coloniale*. Paris, November 10, 1910.

South America M. P. Olson Seffer describes some South American plants which have yielded a remarkable quantity of latex; 537 grammes of latex containing from 14 to 16 per cent of rubber were obtained from the species *Plumeria rubra*, *P. mexicana* and *P. acutifolia*. The most productive method of obtaining the latex is that of cutting the young branches and pounding and steeping them.

Among the best producers are:

Euphorbia calyculata, known in Mexico by the name of *Chupire*; a small well developed plant which gives an excellent rubber.

Pedilanthus tomentellus, a small shrub very common in gardens, used for hedges.

The *Jatropha urens*, easily grown either from seed or from slips.

These plants grow spontaneously in soils ill adapted for culture, and will yield about 84 kg. of rubber per hectare. The *Plumerias* are sufficiently grown for tapping at three years, and their rubber can be sold at 2 frs.50 per kilogram.

An English syndicate with a capital of 7 500 000 frs. has been formed to start the cultivation of these plants.

YVES HENRY. *Hevea Spruceana* of West Africa. — *L'Agriculture pratique des pays chauds*. Oct. 1910, N. 91, p. 335.

According to the writer, the knowledge of the genus *Hevea* is still so far from complete, that it is not possible to arrive at exact conclusions on the causes of variation in the quantity of rubber in the same species of *Hevea*.

Tapping experiments at Porto Novo (Dahomey), from 1907 to 1909, on six *Hevea Spruceana* showed that the average yield of these six plants was 510 gr. of rubber, similar to that in the Malay State plantations. Further tests in 1910 have raised this average to 640 gr.

Experiments made at Ebute-Meta, in 1909, on two trees of the same species gave an average of 275 gr. per tree of excellent rubber.

The value of this species of *Hevea*, which is clearly different in the form of the seeds from that growing at Camayenne and Dabou, is therefore well proved, while the *Heveas* in the two mentioned places are valueless, or nearly so.

French
West
Africa:
Dahomey

Rubber and Guttapercha in New Guinea. — *La Quinzaine Coloniale*. Paris, Nov. 10, 1910.

The German Colonial Committee has sent explorers to New Guinea to search for guttapercha and rubber plants. The results have been satisfactory; the *Palaquium Supfianum*, which yields an excellent guttapercha, was found during the first expedition, and five rubber plants on the last, some of them belonging to the genus *Ficus*. The natives are now being taught to tap the plants properly, so that before long a regular yield of rubber and guttapercha may be expected.

New
Guinea

The American Camphor Trade. — *The Tropical Agriculturist*. Colombo, Oct. 1901.

Japan holds the monopoly for the production and sale of camphor,¹ but in America, attempts have been made to obtain supplies from other sources, especially from China. The introduction and development of the cultivation of camphor has been tried in Florida and Texas for some years, and it is hoped that an artificial camphor made in Germany may, in some degree, take the place of the natural product.

On the other hand, Japan, by keeping the refining of camphor in her own hands, has become mistress of the whole trade. In order to keep up a high standard of production, the Japanese have established, even in the United States, a service of control over the national production.

United
States.
Japan

A. HERBERT and F. HEIM. **The Mineral Nutrition of the Cultivated Mushroom.** -- (*Ann. Sc. agronom. franc. et étrangère*, I, pp. 1-12, 1909). *Botanisches Centralblatt*, N. 44. Jena, Nov. 1, 1910, p. 462.

Analysis of the receptacle of *Agaricus campestris*, in the fresh and in the dry state, and of its different parts, stalk, pileus, lamella and spores, shows, in comparison with horse manure, that the manure is deficient in lime and potash in proportion to its content of nitrogen and phosphoric acid; it is therefore advisable to supplement the horse stable manure with calcium and potassium fertilisers.

The spore-bearing organs of *Agaricus campestris* at different ages are remarkably like in composition, and there is a similar, although less marked, likeness between the different parts of the organs themselves. Mineral assimilation by the mycelium filaments is not affected by the formation and development of the receptacle; mineral foods should therefore be given to the mycelium before the appearance of the receptacle.

J. FARCY. **Truffle Cultivation in the South of France.** -- *Progrès agricole et viticole*. Montpellier, N. 45, Nov. 6, 1910, pp. 574-577.

Truffle cultivation has a promising future in the limestone districts of the South of France. Truffles are sold at 10 to 20 frs. per kilo, and growers with sufficient capital would do well to plant truffle oaks. Advice is given in this article as to the best kinds of oak to plant, and the distance between the trees. Seed-raised trees are preferable, in order that surface roots [*racines traçantes*] may be well developed. Instructions are given on the treatment of the oak when it begins to produce: on watering, tillage and chemical manuring.

A hectare of truffle ground may be worth 3000 frs. at the end of 10 years, and may yield as much as 1000 frs. in a good year.

HENRY DANCY and JOSEPH MARTIN. **Black Truffles and the National Truffle Grounds in the Department of Vaucluse, France.** -- Avignon, 1910, 1 vol. in-16, p. 155, ill.

This is a popular volume for truffle growers. After some general remarks on truffles and natural truffle grounds, the history of the truffle and the special characters of the wild, of the black and of other varieties, the cultivation is described.

There are numerous well managed truffle grounds in the Department of the Bouches-du-Rhône, particularly in the Vaucluse district, and from 5000 to 6000 kg. of truffles are marketed every Saturday. The trade is centralised by the Périgord market and the truffles sold as Périgord truffles.

The truffle crop of the Vaucluse district, which was under 400 000 kg. in 1868, was more than 700 000 in 1903. During the same period, the produce of Dordogne increased from 160 000 to 410 000 kg.

France

France

France:
Vaucluse

Live stock Breeding.**Aviculture. — Beekeeping. — Silk-Production. — Animal Industries.**

E. FAU. **Remedies for Tympanitis in Cattle.** — *L'Industrie laitière*. Paris, Nov. 1910, N. 46, pp. 741-743.

There is a remedy for « hoven » which is new to most farmers, but has been in use at the Merchius dairy farm (Meuse), where there are 200 cows, for about 20 years.

Not one of the animals has ever succumbed when suffering from tympanitis if this treatment has been administered, and there has never been a case of abortion. The treatment is as follows:

1) Take a glass, or a glass and a half (according to the severity of the flatulence) of *petroleum* (oil of petroleum, not essence) and mix it with about two glasses of water; put into a bottle and shake thoroughly to form an emulsion, and then make the animal swallow the mixture.

France:
Meuse

2) In addition, a piece of stick 25 cm. long by 4 cm. in diameter, is fixed with string in the cow's mouth so as to keep it open; a kind of massage is then applied by alternately pressing the hand firmly on the paunch, and flanks of the animal.

After a few seconds the gases are moved and rapidly belched up, and the flanks collapse, soon resuming their normal aspect. If one dose of petroleum is not sufficient, a second one may be administered without any evil effects, but it is seldom necessary.

The petroleum causes abundant salivation, followed by rapid movements of deglutition which cause abundant eructation.

J. N. DERBANNE. **Treatment of Calving Fever.** (Fièvre vitulaire). — *Journ. d'Agriculture pratique*. Paris, N. 46, Nov. 17, 1910, p. 635.

The following explanation of the action of the treatment of fever after calving by insufflation of air is given by C. Bahr, veterinary surgeon, of Danzig, in the *Hannoverscher Landmann*:

“During gestation there is a strong flow of blood to the abdominal organs, for the purpose of nourishing the calf, which flow becomes superfluous when the cow has calved. The udder, which is very much swollen after calving, acts as a regulator for the distribution of blood in the abdomen. If the udder is emptied shortly after calving, the network of blood vessels

Germany

in it, whence the blood flows into the mammae, becomes dilated at the expense of the fore quarters, and especially of the brain.

"Cows which are suffering from fever after calving, generally lie down with the head on the side, seemingly in a desperate condition, but the insufflation of air in the udder immediately relieves the prostration by causing the blood vessels to contract. It is surprising how rapidly the cow, which a moment before was almost lifeless, becomes herself again and begins to eat with appetite. The udder should not be emptied for five or six hours, after calving, and then only by degrees."

DOUARCHE. Acclimatisation of European Cattle in Tonkin. — *Agr. pratique des Pays Chauds*. Paris, Octobre 1910, N. 91, pp. 271-290.

The temperature is not very high in Tonkin, never being much over 35° or 37° C., and the hot season lasts only four or five months.

Even imported animals seem to bear the heat well enough, as long as they do not have to make any muscular exertion. Sunstroke seems to be unknown there, and heat-strokes only occur after excessive labour or a prolonged stay in badly ventilated premises. There are two damp seasons during the year:

- 1) February to April, cold damp, called *du Crachin*.
- 2) May to September, warm damp, the rainy season.

During the first period, native cattle suffer greatly, while the others show a little greater resistance, but they are more easily attacked by cattle plague and succumb to it more readily. The rainy season is mainly characterised by great decrease in the pasturage area, many lands becoming flooded.

The climate of Tonkin is not more scorching than that of the South of France in summer; the prevailing winds are from the N. E. in winter and S. E. in summer, and do not affect imported cattle, which seem liable to suffer only from excessive heat or damp.

There are in the pasture flora of Tonkin, a great number of watery grasses, and the cattle have to eat a large quantity in order to get enough nourishment. As a special, abundant and carefully chosen food is an indispensable factor in the acclimatisation of imported animals, the natural pasturage of Tonkin is not adapted to them. The cattle should be imported at the beginning of winter.

The article contains some interesting remarks on the countries from which cattle are imported, on the choice of breeds, improved or natural breeds, the selection of individuals, etc. It seems that the breeds more likely to succeed in Tonkin are:

Horses: Anglo-Arab, Breton, Polish, Hungarian of the Lower Danube, and in some exceptional cases English thoroughbreds.

Oxen: Bretons of Morbihan, Cows from India.

Goats: From Nubia.

Pigs: The local improved breed is the best.

Sheep: No European breed. In the forest districts of Tonkin and China, the pure Yunnan sheep should be tried.

The writer mentions that all kinds of poultry flourish in Tonkin, in spite of the numerous epidemics of fowl cholera and the great lack of care.

A. GOUIN and P. ANDOUARD. Industrial By-products for Feeding Cattle.

Rice Flour middlings. — *Journal d'Agriculture pratique*, Paris, N, 44, Nov, 3, 1910, pp. 560-562.

When the potato crop is scarce, recourse must be had, for fattening cattle, to other starchy foods. For this purpose, the writers recommend rice flour middlings, which contain a fair proportion of fat and mineral salts and are rich in albuminoids.

Experiments on the digestibility of this substance show that 100 kg. of rice flour middlings contain 67 kg. of nutritive constituents.

France

At the present price of the flour at Marseilles, Bordeaux, etc., viz 13 frs. per 100 kg., the nutritive constituents cost 0.19 fr. per kg.

In a comparison between rice flour middlings and potatoes, it was found that for feeding, 100 kg. of the rice-middlings are equivalent to 375 kg. of potatoes. Rice flour should not be purchased, except on analysis.

F. M. Crucifers and Milk. — *Revue Scientifique*. Paris. Novembre, 5, 1910. p. 599.

M. Groud (*Industrie laitière*, July 30, 1910) states that he found some injurious elements in milk from cows fed with cake adulterated with mustard seed. The practice is unfortunately too common, and the fraud is in this case of a truly criminal character, for while a lamp-oil is extracted from the mustard seed, the essence of the mustard, the harmful constituent, remains in the oil-cake, which is really only fit for manure, and should never be given to cattle.

France

White mustard, which is much less poisonous, should not be given to animals except as green food, before it flowers. Farmers should be thoroughly instructed on this subject, for they ignorantly allow cattle to eat these Cruciferae indiscriminately.

If all crucifers are not poisonous, they all taint milk, and should never be grown except for industrial purposes. Infants, whose organisms are very delicate and whose only nourishment is milk, should be protected against the ignorance of farmers and the unscrupulousness of some oil-cake manufacturers.

C. FINGERLING. Important Modifications in the Feeding of Sucking Calves.

(Die Verwertung des Eiweisses durch Saugkälber. Beiträge zur Physiologie der Ernährung wachsender Thiere). — *Die Landwirtschaftlichen Versuchs-Stationen*, B. LXXIV, H. I. § II; pp. 57-80. Berlin, 1910.

Experiments by V. Sökhlet showed that a calf's utilisation of the albuminoids in milk decreases as he develops. M. Fingerling found the reason of this in the constancy of the composition of milk; so that while an abundant supply of unskimmed milk gives the calf more albuminoid substances than he can utilise, a reduced quantity forces him to consume the nitrogenous substances that are not utilised for the production of flesh, since his food does not supply him with sufficient non-nitrogenous substances (sugar and fats).

The experiments led to the following conclusions:

1. The albuminoids of milk may be better utilised in the feeding of calves by the addition of rich, easily digestible, non-nitrogenous substances such as sugar of milk, butter fat, etc.

2. A better meat yield is obtained from sucking calves by adding to their daily ration of 9 litres of unskimmed milk, sugar and fats corresponding to the energy contained in 200 gr. of fresh milk.

VOULIZ. Dried Potatoes and Dried Yeast in Horse-Feeding.

(Ueber die Verwendung von Trockenhefe und Trockenkartoffeln als Futtermittel für Pferde. Mitteilung aus der Ernährungs-physiologischen Abteilung des Instituts für Gärungsgewerbe). — *Zeitschrift für Spiritusindustrie*, XXXIII J., No. 47, pp. 579-580, Berlin, November 1910.

The following comparative experiments were made on horses weighing 650 kg.: the daily rations given are quantities corresponding to 1000 kgr. of live weight.

Kg.	Raw digestible Protein Kg.	Starch value Kg.	Price (r.) Frs.
a) 9.25 Oats	0.740	5.51	1.82
3.7 Maize	0.262	3.02	0.69
0.19 Linseed oil-cake . . .	0.053	0.09	0.037
0.79 Flour By-products . . .	0.084	0.32	0.098
1.1 Molasses	0.060	0.53	0.086
2.2 Chopped straw	0.004	0.26	0.11
5.4 Hay	0.240	0.67	0.38
Total	1.443	10.40	3.221
b) 9 Oats	0.72	5.4	1.77
3 Dried potatoes	0.07	2.1	0.55
3.3 Barley	0.22	2.4	0.61
7.7 Hay	0.42	2.4	0.66
4.6 Chopped straw	0.03	0.5	0.22
Total	1.46	12.8	3.81

Germany

Germany

Kg.		Raw digestible Protein Kg.	Starch value Kg.	Price (1) Frs.
c) 4.5	Oats	0.36	2.7	0.88
0.5	Barley.	0.03	0.4	0.008
8.8	Dried potatoes	0.18	5.7	1.47
1	Yeast.	0.48	0.7	0.18
7.7	Hay	0.42	2.4	0.66
4.6	Chopped straw	0.03	0.5	0.22
	Total	1.50	12.4	3.508

The writer finds that, for heavy horses, about half the quantity of cereal in the rations could be replaced by equal quantities of nutritive substances in the form of dried yeast and potatoes without interfering with the working capacity or the weight of the horse. The sum of 98.24 frs. per year per horse could be saved in this way.

Protection of Molasses for Fodder. (Melasseverwertung). — *Die Deutsche Zuckerindustrie*, XXXV, No. 43, pp. 823-824, Berlin, Oct. 1910.

A proposal has been made by the *Hannoversche Dirigentenverein* to protect the trade in molasses used as food for cattle. A considerable number of the feeding stuffs containing molasses are of very doubtful value, and as they are sold under various names, the farmers are naturally inclined to distrust molasses foods altogether.

Germany

It is therefore proposed to protect pure products containing molasses by the patented name, *Molassin*, to be added to the names of the other substances in the mixture, such as: *Molassin-Biertreber* (malt-coombs-molassin), *Molassin-Palmkern* (molassin-palm-oil-cake), etc.

Those interested suggest the naming of a special Commission to determine the guaranteed content in molasses and sugar of the products protected by the proposed name.

N. HAUSSON. The Value of Molasses and Molassin as Food for Draught Horses in Sweden. (Beitrag zur Kenntniss des Wertes der Melasse und der Torfmelasse bei der Fütterung von Arbeitspferden). — *Fühlings Landwirtschaftliche Zeitung*, 59 J. 22 H., pp. 761-776, Stuttgart, November 15, 1910.

Sweden

Feeding experiments made with molasses and *molassin*, (a mixture of $\frac{1}{4}$, in weight of molasses to $\frac{1}{5}$ of pulverised peat), were begun in 1908, on draught horses in Sweden.

(1) Estimated on the basis of the following cost per quintal (100 Kgrs.): oats 19.68 frs.; maize, 18.45 frs.; barley, 18.45 frs.; bran, 12.50 frs.; yeast, 18.45 frs.; dried sliced potatoes, 15.00 frs.; linseed oil-cake, 21.65 frs.; hay, 8.61 frs.; chopped straw 4.92 frs.

The results show that molasses, carefully mixed with concentrated foods, have at least as much value in the pure state, as in the form of *molassin*, because the peat has no nutritive properties.

Molasses, at least in limited quantities, produces in draught horses a greater amount of energy than was hitherto believed. A kilogram of molasses containing 45 per cent of sugar, may be given in place of a kilogram of mixed fodder

J. B. LINDSEY and P. H. SMITH. **Effect of Porto Rico Molasses on Digestibility of Hay and of Hay and Concentrates.** — *Twenty-Second Annual Report of the Massachusetts Agricultural Experiment Station*. Pt. I., pp. 81-131. Boston, 1910.

In New England, cane molasses brought in tank steamers from Porto Rico has been on sale for some time at from 12 to 15 cents a gallon of 12 pounds in barrel lots. It has been found to contain from 20 to 28 per cent of water, about 3 per cent of protein (largely as amides), 6 to 7 per cent. of ash, and the rest is of sugars and allied substances.

Since 1905, experiments have been in progress at the Massachusetts Station with regard to the effect of Porto Rico molasses in nourishing sheep.

The following rations were given:

- a) 600-800 grammes hay, 100-250 gr. molasses, 10 gr. salt;
- b) 500 gr. hay, 150 gr. maize meal, 100-200 gr. molasses, 10 gr. salt;
- c) 500-600 gr. hay, 150-200 gr. gluten feed (1), 50-300 gr. molasses, 10 gr. salt.

The results were remarkable and may be summed up as follows:

1. With ration (a):

When cane molasses constituted from 10 to 13 per cent. of the dry matter of the total ration, it had no special effect on the digestibility of the hay; when the proportion of molasses was raised to 20 per cent., the depression was quite noticeable, averaging 10.14 grammes of digestible dry matter and 7.37 grammes of digestible organic matter for each 100 grammes of molasses;

2. With ration (b):

The depression varied from 10.79 to 18 grammes of dry matter, and from 9.51 to 17 grammes of organic matter per 100 grammes of molasses;

3. With ration (c):

With small doses of molasses the depression was greater *per 100 grammes*

(1) Gluten feed, a by-product of maize starch, is a rich protein concentrated feed, containing 25-27 grammes of raw protein, 57-63 gr. of extracts, and 26-43 gr. of fatty matter per 100 gr. of dry product. [Ed.]

of molasses than with large doses; and with the small doses, the loss expressed in dry matter as percentage of molasses was higher than with the large.

Small amounts of molasses caused, as a rule, as much depression as large amounts, the loss averaging 8 per cent.: a higher percentage of loss than with hay alone.

W. SINCLAIR. **Prickly Pear as Food for Milch Cows.** (El Nopal como alimento de las vacas de leche). — *La Hacienda*, Buffalo, N. Y. U. S., Nov. 1910, vol. VI, pp. 54-56,

The feeding of milch cows with prickly pears in Texas has given excellent results; they are cheap fodder, and cattle like them. This article deals with numerous prickly and non-prickly varieties, and points out that in order to render the former suitable for cattle food, the prickles are burnt off with special gasoline lamps; this can be done while the fruit is still on the plant. In this way also the number of plants from which the animals are to feed may be limited.

United
States :
Texas

Cattle-breeding and Registration of Dairy Cattle in Ireland. — *Ninth Annual General Report of the Department of Agriculture and Technical Instruction for Ireland*, 1908-9. Dublin, 1910, pp. 49-50.

During the season of 1909, there were in Ireland 1000 bulls for the improvement of cattle-breeding. 822 were subject to the County regulations and 178 were placed at the disposal of the Congested Districts where one of the features was the giving of prizes to bulls of exceptional pedigree.

The following table first published in 1906, shows the increase in the number of milch cows, their selection and registration.

Great
Britain
and
Ireland

Year	Number of cows entered	Cows under inspection	Cows provisionally selected on account of their merit	Cows excluded after milk testing	Cows reserved for further examination	Cows entered on the register
1906 . . .	621	595	401	35	2	215
1907 . . .	178	175	155	8	19	71
1908 . . .	360	354	316 (1)	—	—	—
1909 . .	839	800	648 (2)	—	—	—

(1) Including 174 Kerry cows.

(2) Including 103 Kerry cows.

PERKINS. **Greece, Sheep and Cattle.** — *Journal of Agriculture of South Australia*, No. 2. Adelaide, Sept. 1610, pp. 112-116.

Greece is a country of short sweet pastures and has a source of wealth in its flocks and herds, that might be further developed. Goat's milk is commonly used, the native cows being poor milkers. Milch cows have to be imported from Switzerland, Odessa, the Crimea and Italy.

Greece

The flocks of sheep and goats contain about 5 000 000 head. Like the Merinos of Spain, they change their pastures with the seasons. There appear to be only two breeds of sheep, perhaps three, which are sometimes crossed. Sheep are reared chiefly for their milk: 20 per cent. are black; the rest are spotted black and white. The average weight is 32 lbs.

Several European breeds have been tried in Greece, but without success. In August and September the milk is very rich, though less abundant. The lambs are neither tailed nor castrated, but are sold at the age of two to two and a half months.

G. R. WALKER. **Cattle Survey of the Amritsar District.** — *The Indian Agriculturist*, Vol. XXXV, No. 10, pp. 304-8. Calcutta, Oct. 1, 1910.

Since the vast pastures in the Amritsar District have come under cultivation, the cattle are entirely stall-fed. With the introduction of bulls from cattle-breeding stations, the Manjha race, once famous in the mountain regions of Lahore, has almost disappeared.

British
India:
Punjab

Bulls of the *Hissar* breed are recommended for the Southern, and of the *Potwar* breed for the Northern parts of this region.

Buffalo raising is extending; the males, which are powerful and resistant, thrive on coarse fodder, and the females are better adapted than cows to stall-feeding. A buffalo-cow gives 4.15 *seers*, on an average 8 *seers* a day. (The *seer* is equivalent to about 1 $\frac{1}{2}$ litres). The milk is used for making *ghi*, the Indian butter (1).

A. B. ABRIUTIN. **Cattle Raising in Russia.** (Krupnii rogiatii Skot konkolodisekoi cel-kos. Scoli). — *Selskoie Xosiaistvo i Liesovodstvo*, CCXXXIV, Tom. God. LXX, pp. 234-246. C. Peterburg, Oct. 1910.

Russia

A fine herd of 389 cattle has gradually been formed since 1889 at the Agricultural School of Kon-Kolodiesk. The breeds are Tyrolo-Simmenthal.

(1) According to Mr. Kitts, Assistant Commissioner in the Hyderabad Assigned Districts, the cow buffalo may yield as much as 13.4 *seers* of milk a day (a little more than 7 litres or quarts). *Dictionary of the Economic Products of India*. G. Watt, vol. III, p. 493. [Ed.]

a cross between the Simmenthal and native breeds, and Simmenthal Ruboscievki, which last are remarkable for milk yield, beauty and size. The cattle are kept at pasture during summer, and in winter are stall-fed according to Wolff's formula.

Data collected during many years, show that careful selection has considerably increased the milk yield, while the average live weight has diminished. For the last 15 years, however, the average of fatty substance in the milk of the Tyrolo-Simmenthal hybrids has been of barely $4\frac{1}{2}\%$.

SCHILLING. Cattle Raising Prospects in the German Colonies. (Die Viehzucht in den deutschen Kolonien). — *Der Tropenpflanzer*. 14, J., N. 11, pp. 555-570. Berlin, Nov. 1910.

M. Schilling considers that the prospects of cattle raising in the German Colonies depend on the following conditions:

1. Details of method must be modified according to the climate, soil and conditions peculiar to each Colony.

German
Colonies

2. At present, cattle raising has only a local importance and its rich produce cannot be exported until railway communications are developed.

3. The first object of the tropical Colonies should be the control of cattle diseases and the formation of a veterinary staff.

4. An exhaustive study of native breeds would show which are best adapted for improvement. Taking these as a base for selection, M. Schilling thinks that sufficient data might be obtained by scientific experiments in a few years.

5. A complete series of preliminary investigations would show whether the crossing of European with native breeds would give effective improvement.

6. The German Colony of South-West Africa might become a centre for the introduction of European cattle from the neighbouring English Colonies.

7. Further experiments would show whether it is advisable to introduce European cattle into other tropical German colonies. The writer suggests the introduction of hardy breeds from Germany.

8. Sheep breeding would have the best prospects in the German colonies.

The Cost in England of a Day's Horse Labour on the Farm. (Agriculture at the British Association). — *Nature*, No. 2140, Vol. 85, Nov. 3, 1910, p. 25.

Great
Britain

This important question has been little studied hitherto. Mr. Hall puts the cost of a day of horse labour at 2 s. 7 d. (3 fr. 23 c.).

NEMETH. **The Stud Farms of Bâbolna.** — *Revue de Hongrie.* Budapest, N. 5, 1910.

Hungary

In connection with the stud farms of Bâbolna, the Hungarian Department of Agriculture has instituted Service Stations throughout the country, to which all breeders have access. There are now 4 State Depots, supplying 905 Stations, with 3 075 stallions, a fifth of which are Arabs. On the sandy pastures of the Bâbolna farm, there are 15 stallions, 49 thorough bred mares, 154 half-bred mares and 516 colts and fillies.

The stallions represent the noblest Arab breeds, such as Mersuch, Siglavy, Koheilan and Gazal.

BECKER. **Iceland Horses.** (Das islandische Pferd). — *Landw. Umschau.* Magdeburg, Nov. 1910, N. 46, pp. 1134-1135.

Denmark:
Iceland

The use of Iceland horses is spreading in Denmark, especially in Jutland; they are excellent farm horses, being hardy and resistant to fatigue. The Iceland horse is small, stoutly built and strong. They are bred without selection and live in an almost wild state. There are about 45 000 of these horses in Iceland; from 3 000 to 4 000 are exported yearly, to Denmark, and to England and Scotland.

The article is illustrated.

MACCALL. **Sheep Farming in South Africa and the Preparation of Wool for Market.** — *Office du Gouvernement général de l'Algérie.* Paris, Nov. 1, 1910.

South
Africa

The value of wool depends upon conditions of race, physical constitution, system of breeding and the age of the sheep that produces it. In forming a flock, the farmer should have special regard to surrounding conditions. Climate has the greatest influence in fixing the type of breed, as may be seen by the fact that the same ancestors — the Spanish Merinos — have produced two distinct types, the Rambouillet and the Vermont. Although these types have been selected, the same results could not have been reached without the aid of favouring conditions and climate. It is known that some regions are peculiarly adapted for the production of fine wool, others for strong wools; it is also the rarest exception to find very fine wool on sheep with powerful and coarse frames. Age has much to do with the quality of wool. By the time the second teeth appear, the fleece is at its best, after this, quantity and quality diminish until the animal is no longer profitable for wool. As a rule, it is well to eliminate when dentition is complete, or even earlier.

At shearing time, the sheds should be thoroughly freed from dust, and the floor should be smooth and easily washed.

Mr. MacCall's experience of the South African Wool Market, leads him to conclude that minute classification is not profitable. All wools of full growth, from sound fleeces with a uniform length of staple, may be ranked as first class. Short fleeces and lamb's fleeces form the second class; the third comprises belly wool, "tender" wools and fleece trimmings. The waste gathered from the shearing boards and stained wool form the fourth class; the fifth contains only fleeces of large rams.

The most common method of packing is to make bales of bundles of two layers of three rolled fleeces each. A good average weight for a bale is from 136 to 159 kg. They must not be too tightly packed but sewn firmly and carefully marked. They should be kept in a dry place until sent to the sale room.

The trouble entailed by following these instructions will be repaid, because the wool will fetch better prices.

Algerian Pigs at Dunkirk. — *Office du Gouvernement général d'Algérie.* Paris, Nov. 1, 1910.

An experiment which may have an important influence on the raising of pigs in Algeria, has been made by the farmers of the North of France, who have imported 250 pigs from Oran, to be sent eventually, to the pork-butchers of Dunkirk, Béthune, Arras and Paris. Other consignments are to follow, and it is hoped that the experiment will be successful.

Algeria

G. LAVRIELLE. **Draught Dogs.** — *Bull. mensuel de la Société centrale d'Agriculture, etc., de Nice et des Alpes Maritimes.* Nice, Oct. 1910, L année, No. 10, pp. 354-359.

In the illuminated ornamentation of books of the XIIth and XIIIth centuries we often find dogs in harness, but no race of dogs was bred for this purpose. Prof. Ad. Reul and Count T'Serclacs, of Wommerson were the first to found a Draught-dog Society, the object of which was to reconstitute the Belgian breed of mastiffs and to improve the condition of working dogs. The association met with complete success.

Belgium
France

Official statistics show that about 150 000 draught dogs are used in Belgium, 10 000 of which in Brussels and its suburbs. Putting the value of the daily labour of each dog (many of them work for 7 hours a day) at 50 centimes, we have a total of 75 000 francs per day and an annual total of 22 500 000 francs, allowing for 65 days of rest.

If an averagely strong mastiff be rationally harnessed to a well-balanced cart, so that the shafts, placed horizontally, reach to the middle of his body, he can draw a load of from 100 to 150 kg. to a distance of about 12 kilometres in an hour without fatigue.

The draught dog is not usually employed in France, but in the De-

partments of the North there is a type of mastiff which, trained and selected, should equal the Belgian mastiff. The St. Bernard might also be trained to harness.

A *National French Draught Dog Syndicate* (*Syndicat nationale du chien de trait français*) was formed some months ago, with head quarters at Lille.

Chinese Refrigerated Pork in England. — *L'Agriculture Commerciale*, Paris, Nov. 27, 1910.

China Large cargoes of refrigerated pork from China are constantly delivered in London. Of 4643 frozen carcasses, examination has shown 92 per cent to be fit for food. A stricter examination of the cargoes before embarkation for England, would ensure their full utilisation.

Chinese pigs for exportation are of fine black and white breeds, large numbers of which are raised in the district between Lake Toung-Tinh and Locheon. Their main food is rice.

W. DOMBROWSKI. Ferments in Milk and in Milk Products. Contribution to the Study of the Microflora of Milk and Milk Products. (Die Hefen in Milch und Milchprodukten. Beitrag zur Kenntniss der Mikroflora der Milch und der Milchprodukte). *Centralblatt für Bakteriologie — Parasitenkunde und Infektions-Krankheiten*, Jena, Nov. 3, 1910 No. 12-15, p. 345.

Germany Besides bacteria, milk and milk products contain usually ferments of different genera and species. The *Torula* are the most frequent; after which come the genuine *Saccharomyces* and various *Mycoderma*.

The action of ferments in milk is not limited to the formation of alcohol and carbon dioxide, but a slight formation of acids is also set up. Some species have a strong peptonising action, others produce change of colour, taste, etc. Besides those which cause the fermentation of sugar, there are others which produce no fermentation; these are so diffused in milk that they must be regarded as permanent guests.

Lactic ferments differ from industrial ferments, in their adaptation to the special conditions of nutriment afforded them by milk. The chief differences consist:

- 1) In the capacity many species have of causing the fermentation of lactose, but not of maltose;
- 2) In their sensitiveness to alcohol and the consequent lower degree of fermentation;
- 3) In the preference of lactose ferments for *peptonic* nitrogen in comparison with amidic nitrogen, or, in more general terms, in their adaptability to the assimilation of more complex proteic substances. This attitude

of lactic ferments in regard to the sources of nitrogen, seems due to their production of lactase.

Other differences appear; for instance, in a longer period of fermentation, in greater resistance to common salt, and, in comparison with beer yeast, even in regard to lactic acid.

Sale of Skimmed Milk. — *L'Agriculture Commerciale*. Paris, November 27, 1910.

The following Bill has been laid before the Agricultural Commission:

"Skimmed milk must not in future be sold or carried at the same time as pure milk; it may be sold only in special premises bearing a sign with the words; "Skimmed milk shop or dépôt," or "Skimmed milk on sale," and it may be transported only in cans with the words "Skimmed milk" written legibly upon them. Skimmed milk must contain at least 15 gr. of butter fat per litre."

France

Adulteration of Milk. — *L'Agriculture Commerciale*. Paris, Nov. 27, 1910.

The Director of the Authorised Laboratories for the repression of fraud, has sent a circular to each of them, in which he points out that the Superior Council of Public Hygiene has long prohibited the addition of bi-carbonate of soda, or any other alkaline substance, to milk to preserve it.

France

When a sample of milk is shown by analysis to contain bi-carbonate of soda or some other alkaline substance, a statement must be made on the report of analysis, to the effect that this fact constitutes adulteration.

A Method for Preserving Butter. — *L'Industrie du Beurre*. Niort. N. Oct. 23, 1910, p. 511.

The butter, after being thoroughly washed, is shaped into prisms and glazed. The glaze is made by dissolving powdered white sugar in hot water, and is applied with a very soft brush. The heat causes the syrup to penetrate the butter very slightly and, mixing with it, to form a perfect glaze when cold. The butter is thus coated by an attractive looking varnish or glaze, which preserves it perfectly by excluding air.

France

Utilisation of the Whey of fat Tilsit and Limbourg Cheeses. — *Molkerei Zeitung*. Hildesheim, XXIV, 49, 1910. *Rev. Général du Lait*. Lierre, Nov. 20, 1910, N. 17, p. 45.

Germany
Holland
Belgium

The whey from fat Limbourg and Tilsit cheese contains a minimum residuum of about 0.3 per cent of fatty substances, increased by the slight-

est defect in the manufacture of the cheese. It is estimated that 450 frs. worth of butter may be collected in three months in cheese factories using 1600 litres of milk per day.

Butter is obtained from whey by extracting the cream by centrifugation and then repeating the process on the cream which is too liquid. The product is cooled and kept in a cellar, until there is sufficient for churning. The day before churning, the cream is acidified at 18° C. by means of pure cultures, which greatly improves the butter.

The whey, which remains after the double centrifugation, is mixed with molasses, or barley, pea or bean meal, and used to feed pigs.

G. WENGER. The Use of Pure Cultures in the Preparation of Rennet for the Manufacture of Emmenthal Cheese. (Ueber die Bedeutung und die Erfolge der Reinkulturen bei der Labbereitung in der Emmentaler Käserei). — (*Mitt. des Milchwirtsch. Vereins im Allgäu*, July 1910, S. 199-202). *Milchwirtsch-Zentralblatt*, Leipzig, Nov. 1910, N. 11, p. 521.

Excellent results have been obtained in Switzerland by the use of pure cultures in the preparation of rennet for making Emmenthal cheese. A uniform acidification is obtained, and the inconveniences (swellings and ropiness) sometimes attending the use of other methods are avoided. The pure cultures ought not to be kept for more than a month.

The oftener they are renewed, the better are the results. Their duration varies according to locality.

G. FASCETTI. The Salting and Ripening of Roman "Pecorino." (Cheese from sheep's milk). Sulla salagione e la stagionatura del pecorino romano). — *L'industria lattiera e zootecnica*. Reggio Emilia, Nov. 1910, pp. 416-417.

Italy The makers of the *pecorino* cheese of the Roman Campagna (*Agro Romano*), united in associations, have organised and improved their industry. The product is brought to well constructed cheese-dairies (*caciare*) from the remotest parts of the Campagna for salting and ripening. The cheeses are pricked with a needle and rolled in a box of salt, so that all the surface is lightly rubbed and impregnated with salt. If they show a tendency to swell, they are immersed for several days in cold salt water, which checks too rapid fermentation. They are then placed on stages (*scaloni*) and the upper part covered with a layer of salt, renewed every two or three days during the first period (10 days), and afterwards, once a week for three or four months. When the cheeses are well hardened and do not absorb any more salt, the salting is finished and the ripening begins. The shapes are cleaned and corrected if necessary, and covered with a paste of olive oil, suet and kaolin,

which protects the cheese against excessive drying which would injure the quality and delay ripening, as well as cause a perceptible loss of weight.

The technical requirements of the salting and ripening processes necessitate at least two warehouses: one underground where the temperature ought to be practically constant (about 12° C.) for the first period of the salting, and for the last period of the ripening process and for warehousing the cheese; and another for the second salting period and the drying of the cheese by the elimination of the whey, the temperature of this last varying between 15° and 18° C.

A project has been formed for the construction of a large cheese dairy, to contain 100 000 cheeses of a total weight of 9 or 10 thousand quintals, which represents the amount placed on the market yearly by the large *pecorino* manufacturers.

The Butter and Cheese Industry in Japan. — *L'Agriculture Commerciale*. Paris, Nov. 27, 1910.

The manufacture of cheese and butter is becoming a very important industry in Japan, especially in the district of Hokkaido, and the Government is increasing the import duties on these products.

Japan

Europeans, who would devote themselves to this industry in Japan, would receive great encouragement from the Government and have an excellent chance of success.

Mc NAUGHTON. Coulommier Cheese in Canada. — *Dept. of Agriculture, Bulletin 20*. Ottawa, Oct. 1910.

The manufacture of the French cheese *Coulommier* is extremely simple. The writer strongly recommends its manufacture in Canada, as its production is not costly, a gallon of milk giving 2 lbs of the cheese.

Canada

It may be put on the market a week after being made, and its manufacture does not require either much space or costly apparatus. There is a considerable demand for it among small sized cheeses.

Royal Institute for Classifying Wools at Budapesth. — *Les Institutions Agricoles hongroises*. Edition du Minist. Royal Hongr. de l'Agr. 1910.

The Royal Institute for the Grading of Wools at Budapesth examines and controls washed and unwashed wools in the interest of sheep farmers. It gives advice on the breeding of sheep and renders assistance in the selling of wool. Both examination and advice are gratuitous. It also makes washing test experiments and determines the value of wool to be sold unwashed.

Hungary

In disputes between buyers and sellers the Institute acts as expert.

K. WAGNER. **Poultry Raising and the Increased Price of Meat.** (Fleischteuerung und Geflügelzucht). — *Fricks Rundschau*, Nov. 5, 1910.

Instead of organising poultry shows with money prizes, diplomas and medals, the following measures are suggested for the encouragement of the poultry industry:

I. The distribution of prizes in money among poultry farmers undertaking to put a certain number of fowls and eggs on the market every year at fixed prices.

II. Prizes in money to be awarded, in each commune where poultry raising is carried on, to farmers raising the best 4 months' chickens and 8 months' hens for breeding.

III. The leasing of pasture lands on favourable conditions to farmers applying for them, subject to the obligation of placing a given number of fowls and eggs on the market at fixed prices.

IV. Subsidies to be given to Poultry Societies, undertaking:

- 1) To sell selected fowls and fertile eggs at reasonable fixed prices;
- 2) To organise poultry Shows;
- 3) To sell corn and other foods for poultry at cost price to small poultry farmers;
- 4) To build model poultry houses and publish practical treatises on the raising of poultry;
- 5) To draw up statistics of poultry production, each Society in its own district;
- 6) To institute courses of lectures by experts whom the breeders could consult;

V. The institution of a compendious and practical course of poultry-raising in country schools, in Schools of Practical Agriculture and in High schools of Agriculture;

VI. To institute covered poultry markets in the principal towns.

D. F. LAURIE. **Poultry Breeding in South Australia.** — *The Illustrated Poultry Record*. October 1910. London.

The breeds of poultry generally raised in S. Australia are Orpingtons, Wyandottes, Rocks, Old English Game and White Leghorns.

During recent years, breeders have aimed much more at useful market qualities than at mere show. This is due to the action of the State in fostering poultry-breeding as a national industry. The S. Australian White Leghorns take the lead in egg-production and have attracted world-wide attention in public competitions, under strict official supervision.

Germany

South
Australia

CH. GROUD. **Whey as Poultry Food.** (Le lait et ses dérivés dans l'alimentation du petit bétail). — *L'Industrie laitière*. Paris, 1910, N. 47, pp. 757-759.

Excellent results have been obtained, both for egg-production and for fattening, by using whey and desiccated skimmed milk for feeding poultry.

P. Peters recommends feeding bees with whey given in the following syrup:

Boiling water.	225 gr.
Fresh whey ,	225 »
Crystallised sugar	400 »
Very fragrant honey . . .	140 »
Phénix syrup (?)	10 »
	1000 gr.

France

W. P. BROOKS, E. S. FULTON, E. F. GASKILL. **Influence of Feeding on Egg-laying.** — *Report of the Agriculturist*, X, XXII, *Annual Report of the Massachusetts Agricultural Experiment Station*, Part. I. pp. 36-45 (44-45). Boston, 1910.

Six series of experiments made with 6 different breeds of fowls, three series in summer and three in winter, have shown that hens lay better on a wet than on a dry diet. The average results were as follows:

	Number of eggs per day per 100 hens
Wet diet	36.3
Dry »	34.5

United
States:
Massa-
chusetts

Fattening Turkeys. (Ueber Putermast). — *Landwirtsch. Umschau*. Magdeburg, Nov. 1910, N. 44, p. 1087.

Turkeys are fattened in Germany by being kept about three weeks on the following diet:

In the morning, barley meal, slightly cooked wheat bran, maize which has been soaked in water, and boiled potatoes. At midday and in the evening, wheat and oats. Oats are considered excellent food. The birds are allowed free pasturage.

The article contains a brief review of other methods used in England for fattening turkeys, and some rules as to their hygiene.

Germany

Turkey-Breeding on Open Lands. — *The Illustrated Poultry Record*. London, Nov. 1910, p. 56.

The *National Poultry Organisation Society* suggests the breeding of turkeys on uncultivated land.

Great
Britain

There are in Great Britain twenty-four million acres of uncultivated land, many millions of which are suitable for turkeys. The wolds and moors of Yorkshire and the medium elevations of Wales might maintain profitably more turkeys than now exist in the whole of Britain.

ALB. B. Preservation of Eggs by Cold Storage. — *Revue Scientifique*, November 1910. Paris, p. 621.

Germany.
United
States

A large number of eggs are preserved by cold storage in Germany and in the United States, a method which gives excellent results if certain precautions are observed. The temperature of the storage rooms must not be too low (between $+1^{\circ}$ and $+4^{\circ}$ C.), and the air ought to be sufficiently moist to prevent evaporation. Eggs kept at -1° C. ought to be used as soon as they are taken out of storage; whereas eggs that have been kept at $+1^{\circ}.7$ and $+4^{\circ}.4$ C. may be kept some time at the ordinary temperature.

Liquid Eggs. — *L'Agriculture commerciale*. Paris, Nov. 27, 1910.

Russia.
Bulgaria

Liquid eggs are a commercial product formed by the simple mixture of the contents of eggs of the same species. The largest producers of these eggs [Russia and Bulgaria] export the *whites* and *yolks* separately. The *whites*, after being dried in a stove, are exported in the form of flakes containing more or less impurities. The yolks are exported in the liquid state preserved by the addition of about 12 per cent of salt and 1 per cent of boric acid.

The Customs Commission of the French Chamber has put an import tax on these yolks equal to the ordinary egg tax *plus* a tax on the salt, etc., which they contain.

After-Effects of the Egg Train. — *The Illustrated Poultry Record*. London, Nov. 1910, p. 57.

Great
Britain:
Wales

The Egg and Poultry Demonstration Train, which covered various districts of South Wales last April, has led to excellent results. It has given a great stimulus to production and selection, the demand has increased and prices have gone up.

Several Societies have already been formed for production and sale and Co-operative methods have been introduced: facts which sufficiently demonstrate the usefulness of the expedition organised by the National Poultry Organisation Society and the Agricultural Organisation Society.

Italy

Industrial Sericulture in Italy. (Inchiesta sull'industria serica). — *Bollettino di sericoltura*. Milan, Nov. 12, 1910.

The Italian Ministry of Agriculture is preparing a report on the In-

quiry into the Italian silk industry, and a Bill is to be presented to Parliament for its development.

Special measures are also being taken to develop the raising of silk worms in the South of Italy, and to institute a bank for the silk industry.

Experiments with the "Toussah," Silk Worm in Italy. (Esperimenti d'allevamento del Toussah in Italia). — *Bollettino di sericoltura*. Milan, Nov. 12, 1910.

Professor Lenticchia has recently made interesting experiments at Como on the breeding of *Toussah* (*Antheraea Peruyi*) silk worms in the open air, on oak trees (500 *Quercus cerris* and 2500 *Quercus robur*).

Out of 356 cocoons sent from China, 248 reached the moth stage, laying 176 grammes of eggs. Professor Lenticchia calculates that the quantity of *Toussah* silk worms on each young oak would be worth about fr. 200 net, because although the loss through birds and insects and bad weather is great, the breeding losses are very small.

As the silk is easily wound by hand, the winding might form a winter home industry.

It has been found that silk-worms die on oaks attacked by *oidium*; experiments are therefore being continued on the holm-oak, or ilex (*Q. cerris*), which is not subject to *oidium*, a last trial only being made on oaks previously treated with sulphur to protect them from *oidium*.

Italy

Silk Culture in Ferghana, Turkestan. — *Bulletin des soies et des soieries*. Lyon, Nov. 12, 1910.

Silk industry is already important in the district of Ferghana, and might be greatly developed, if eggs of good quality were imported. Local industry furnishes from 30 to 35 per cent of the eggs used; from 10 to 15 per cent come from France and Italy, and the rest from Turkey.

Russia:
Turkestan

The local dealers sell a very poor product, which can only be improved by the organisation of serious control in the district, and producers should be obliged to put official labels on the boxes of eggs they sell.

There is a Sericultural Station at Samarcand, which makes a microscopic examination of silk worm eggs and authorises dealers to sell them; but there is no control at all for the actual sale on the market. In Turkey, on the contrary, the production of the eggs is admirably organised.

Sericulture in Corea. (La sericoltura in Corea). — *Bollettino di Sericoltura*. Milan, Nov. 12, 1910.

As Corea does not, at present, produce sufficient silk for its own consumption, silk is imported from China. The Japanese have obtained splendid

Japan:
Corea

results at Suwou from the acclimatisation of mulberry trees and silk worms' eggs. The women have founded a Sericulture Association, to which the Japanese Government has presented 39 000 mulberry trees; 25 000 trees have also been distributed free among various cultivators.

Travelling teachers of sericulture have been appointed, and owing to Japanese initiative, Corea will probably soon have great influence on the silk market.

Crossing of Silk-worms, with Reference to Mendel's Law of Heredity. —

A General Report of Sericultural Investigations, pp. 147-150. *The Imperial Sericultural Institute*. Tokyo and Kyoto, 1910.

The points of chief importance in experiments on the crossing of different races of *Bombyx* are:

a) Colour of Cocoon.

The first generation (F_1) of hybrids from Chinese races with white and yellow cocoons have yellow cocoons.

Japan The second hybrid generation (F_2) produces 76.43 % of yellow cocoons and 23.57 % of white.

Similar results were obtained with yellow and green races, and with green and white.

In all cases it was found that the yellow cocoon is dominant over the green and white, and the green over the white.

b) Marking of the worm.

In crossing the female of the black marked and the male of the brown marked race, the results in F_2 were as follows:

17.14 % of black marked worms;

22.23 % of brown marked;

53.94 % of double marked;

6.3 % without marks.

These proportions correspond remarkably with Mendel's law.

c) Number of moultings.

In F_1 of the cross between the "three moulting" and the "four moulting" breed, all the worms moulted thrice.

In F_2 both the three moulting and the four moulting worms were produced. This experiment shows that the three moultings are dominant over the four.

Lighting the Cocoonery. — *Le Moniteur des soies*. Lyons, Nov. 19, 1910.

Japan Silk-worm breeders in Japan have generally kept the cocoonery darkened, perhaps because silkworms, if put in a sunny or windy place during the early

stages of cocoon spinning, nearly always begin spinning huddled in a corner of the bush.

In order to prevent the climbing worms from adopting this bad habit some breeders keep the cocoonery as dark as possible, and have doubts as to leaving the door open, even when there is no more fear of the worms crowding together.

Other breeders seem to think that worms kept in the dark have more silk, but experiments prove that not only is no advantage gained by keeping the room dark, but the quantity of silk tends to decrease in the dark, as the following table will show:

		Percentage of cocoons		Weight per 100 empty
		superior	inferior	superior cocoons
<i>Light room:</i>				
Once.	. . . 89		7	21.90 gr.
Twice	. . . 86		8	21.11 »
<i>Dark room:</i>				
Once.	. . . 86		10	19.95 »
Twice	. . . 87		8	20.76 »

These worms were kept in the two rooms under precisely similar conditions but for the difference in light. It is to be considered, further, that the darkening of an ordinary room invariably prevents its proper ventilation and makes it damp, the difference in favour of the light room will be found to be even greater.

Mulberry Plantation. Transportation of Mulberry Leaves. — *A General Report of Sericultural Investigations, Group II. Experiments on Mulberry Cultivation, I, pp. 23-25. The Imperial Sericultural Institute, 1910.*

Experiments were made with the following methods, to determine the best means of preserving and transporting mulberry leaves:

a) The Standard method: The leaves were picked and kept for 36 hours in a room set apart for the purpose;

Japan

b) They were wrapped in rice straw matting, exposed to the sun for three hours, and then placed on the ground in the shade.

c) Exposed, as in b, but in rice-straw bags.

d) *Idem*, in bags made of rice-straw matting.

e) *Idem*, in baskets.

Each of these methods was tried upon 1500 silkworms at the beginning of their fourth moult and gave the following results:

Method	Comparison of crops of cocoons	Weight of good crops	Cocoon weight to 100 Kilograms of mulberry leaves
	Kg.	Kg.	Kg.
a)	1.81	1.47	7.64
b)	1.58	1.29	5.25
c)	1.26	1.31	4.16
d)	1.71	1.40	5.67
e)	1.61	1.32	5.34

These figures show that the leaves treated according to the Standard method, formed the best food for the worms. The others were all more or less inferior, in proportion to the exposure to the sun entailed by the several methods of packing. The greatest care should be taken to protect leaves brought from a distance against the sun, so as to avoid fermentation and desiccation.

Agricultural Industries.

Museum of Vineyard Apparatus in Germany. (Das Weinmuseum in Speyer).
Zeitschrift für Agrarpolitik. Berlin, Nov. 1910.

Germany A most original museum has been inaugurated at Speyer, on the Rhine. It contains all kinds of ancient German and Roman vineyard instruments, as well as coins bearing reference to the vine or to wine. There are, amongst other things, a superb amphora of the time of Constantine, some casks of the middle ages, Merovingian and Frank pottery, and field implements of more modern times.

It is, in fact, an historical and artistic collection illustrating wine culture and oenology from Roman times to the present day.

Diffusion Wines. — *Bull. men. de la Société d'Agric. commerciale et industrielle du Var*. Draguignan, Oct. 1910.

According to its promotors, a perfectly pure wine may be obtained by the diffusion process, that is to say, exhausting the pressed grapes, after the wine has been drawn off, by means of a current of water; but wine thus obtained, must be poor or watery if the operation is not conducted with every possible precaution.

France

The French Ministry of Agriculture has therefore ordered an inquiry into the conditions under which the process is performed, to ascertain whether it is to be considered an illicit wine-making process or not. In the meantime, those diffusion wines which have all the characteristics of normal composition will be considered as natural wines.

P. D. The Roos "Zymogen." — *Progrès agricole et viticole*. Montpellier, N. 45, Nov. 6, 1910, pp. 570-572.

One of the interesting novelties which attracted attention at the Montpellier Agricultural Show was the *Zymogen* apparatus designed by M. Roos, by which the selected ferments used by wine manufacturers may be multiplied continuously and without limit.

France

The apparatus and the culture must be sterilised by steam heating, a petroleum stove being used for the purpose. In order to sow the culture, the sterilised point of an ampulla is broken under conditions that make contamination impossible, and the aeration, indispensable to an abundant culture, is assured by passing a current of sterilised air through a layer of sterilised cotton.

The *Zymogen* can produce more than 25 litres of fully active ferments daily, a quantity more than sufficient for making 500 hectolitres of wine.

L. MATHIEU. Sale of Wine by the Kilogram, — *Progrès agricole et viticole*. Montpellier, N. 45, Nov. 6, 1910, pp. 572-574.

To save time and simplify calculation, wine is now often sold by weight instead of volume.

France

The volume of 100 kg. of wine is known to vary according to the temperature and the composition of the wine. In wines with from 8% to 12% of alcohol, at a temperature of 10° to 20° C., the volume of 100 kg. varies between 100.2 and 100.9 litres; 100 kg. = 101 litres as a general standard is too high, and 100 kg. = 102 litres is higher still.

M. Mathieu considers that temperature should be disregarded, and one, or at most two, standards used for all wines. He suggests as the most rational standard 100 kg. = 100.5 litres, which may vary within half a litre from a little above to a little below the mark.

L. MATHIEU. **Proportion of Sulphurous Acid in Wines.** (Dosage de l'acide sulfureux dans les vins). *Annales des falsifications*. Paris, N. 24, Oct. 1910, pp. 410-417.

The Governments of the following countries have prescribed limits to the amount of pure or combined sulphurous acid permissible in wines: Germany, Belgium, Brazil, Spain, the United States, France, Italy, the Argentine Republic, Rumania, Switzerland, etc.

France M. Mathieu gives the results of comparative experiments on the more common methods for determining the quantities of sulphurous acid (those of Ripper, Wartha and de Haas respectively). The method of de Haas is considered the most exact. The proportion of free and combined sulphurous acid can, by means of suitable methods, be computed as easily as that of any other substance, and large deductions are unnecessary.

Divergences depending on the way a sample has been taken, or on its state of preservation, can be ignored if oxidation is avoided, or can be explained, except where there is fermentation, by the proportion of sulphates.

FRIDERICH. **Prof. Dutoit's New Method of Wine Analysis.** — (La méthode nouvelle d'analyse des vins du Prof. Dutoit, de Lausanne). *Mon. Scient.* Paris, Nov. 1910. Livre 827, pp. 705-10.

An application of physico-chemical methods to wine analysis, the importance of which has been recognized by the Société des Agriculteurs de France, who have awarded Prof. Dutoit the *Olivier de Serres* gold medal.

Switzerland By determining the temperatures at which solution takes place, Messrs Dutoit and Duboux estimate the amount of alcohol in wine.

The electrolytic conducting property of wine, when neutralized by baryta, gives the amount of sulphates, acids, and substances of the nature of tannin.

The potential of an hydrogenous electrode immersed in the wine during its neutralization, serves to determine the content of weak acids, and to confirm the results obtained by methods of conductivity.

The mode of operation is briefly described, a specimen of the report on the physico-chemical analysis of wine is given, and stress laid upon the importance of making this method known, and of experimenting in the same direction.

DUMITRESCOU and NICOLAU. **Researches on the Manganese in Wine.** (La recherche et le dosage du manganèse dans le vin). — *Annales des falsifications*. Paris, No 24, Octobre, 1910, pp. 407-410.

Rumania Messrs Dumitrescou and Nicolau analysed 52 samples of wine, using persulphate of ammonia which has the property of precipitating the manganese without the smallest trace of the iron or aluminium present.

After giving a technical account of their method, the writers conclude:

1) That white, red and dark-red Rumanian wines all contain manganese, which must be regarded as a natural constituent of wine.

2) The proportions vary directly as the amount of manganese in the soil.

3) Analysis with persulphate of ammonia is simple, rapid and precise. The proportion of manganese may amount to 27 milligrammes per 1000 cubic centimetres.

Desiccation of Cider Apples. — *Revue Scientifique*. Paris, Oct. 29, 1910, 2° Sem. No 18, pp. 560-561.

Apples contain 75-85 per cent of water, and it is not possible to dry them in Brittany and Normandy by simple exposure to the air and sun.

An article in *Le Cidre et le Poiré* (Aug. 1910) enumerates the essentials of a good drying apparatus. The temperature of the evaporating chamber should never exceed 100° C., or the apples acquire a cooked taste impossible to get rid of.

France

The fruit is put into the apparatus near where the hot air leaves it, and proceeding in the opposite direction comes out near where the hot air enters, so that it comes in contact first with a slightly damp atmosphere.

This method is essential, or the drying would be too sudden and the skin of the apple would lose its suppleness and porosity. The quicker the drying, the better the flavour. If this process be carefully carried out, the fruit, when placed in water, will be found to have recovered all its original qualities. With a good evaporator the temperature and speed of the current, which should circulate with an even intensity, can be varied at will.

ED. MOUFANG and J. B. BRENDLEN. **Cleaning Beer Bottles.** (*La bière et les boissons fermentées*). — Paris, Oct. 1910, No 10, pp. 109-111.

Beer bottles may be thoroughly cleaned by using a strong alkali first, and then an acid. The most perfect sterilisation is obtained by using these two agents together with oxidising substances.

The experiments described were made to discover the chemical agents and the conditions essential to absolute sterilisation. "Neither hot water nor steam is economically advisable: the comparative effects of soda, caustic soda, sulphuric acid and bichromate of potash at a low temperature were studied, to secure the most rapid effect with minimum quantities. As empty bottles contain organic and inorganic impurities including many infectious organisms, the utility of these substances is obvious. The results are drawn up in tables. It is advisable to use machinery rather than hand labour. The use of brushes, chains, etc., only serves preliminarily to clear away

France

insoluble impurities, but never has the sterilising efficacy obtained by chemical agents. The cleansing apparatus should be as simple as possible, combining a maximum of output with a minimum of material and labour. M. Moufang describes an apparatus meeting these requirements. After preliminary cleansing with brushes, the bottles are placed first in an alkaline and then in an acid bath, and afterwards well rinsed.

A new Source of Supply of Alcohol. — *The Tropical Agriculturist*. Colombo, October 1910, p. 370.

United
States
and
British
India

The *Pioneer* recently published an account of an agricultural experiment tried by the Agricultural Department of the United States. Some cacti were planted in rows ten feet apart and after four years had grown into clumps eight feet wide. The six kinds of sugar obtained from the fruit were fermented to produce alcohol. It was estimated that in four years cacti would yield cheap alcohol to the value of 460 rupees per acre (1 Rupee = Fr. 1.60). If the barren wastes of India were planted with cacti, the wealth of the country would in four years be increased by the enormous sum of 5180 crores (1) of rupees. Among the by-products, are colouring matter, and cactus leaves for fodder.

General Interest in Sugar. — *The Philippine Agricultural Review*. Vol. III, No. 9. Sept. 1910. Manila, p. 502.

Philippines

Sugar plantations are rapidly extending in the Philippines. But while cane production constantly increases, the methods of extraction remain so primitive that much sugar is thus lost annually, and much of the cane is used as fuel for evaporating the juice in open boilers.

Good central mills are urgently needed in all the principal sugar districts.

Sugar Industry in Peru. — *Peru To-day*. August, 1910, Vol. II, No. 6, p. 17. Lima, Peru.

Peru

According to tradition, the sugar cane was introduced into Peru in 1570. Its culture has only become important within the past 35 or 40 years, but as the conditions of the country are favourable it should continue to develop.

In most Peruvian estates the soil is damp, and drainage is of recent introduction. After drainage sometimes the soil is dressed with lime, or cultivated with maize or rice before planting the cane.

Irrigation is applied from eight to twenty-two times during vegetation.

(1) 1 crore = 16 500 000 frs. [Ed.].

Pumps are seldom used, the water generally being conveyed to the fields from the rivers through canals.

Among the pests of the sugar cane is the *borer*, a beetle which by boring into the plants exposes them to the invasion of a very destructive fungus, especially where damp is excessive. The leaves are liable to be attacked by a caterpillar, and rats are another cause of damage.

There are three chief varieties of cane: the white or yellowish white, the greenish yellow and the red: but the only variety cultivated on a large scale is the *Jamaica Amarilla*, a large yellow cane. The plant reaches maturity in eighteen to twenty-four months according to locality.

The proportion of saccharose varies from 12 % to 17 %, depending much on methods of cultivation. The production of cane per hectare (2.47 acres) ranges from 100 to 120, and even 150 tons.

There are in Peru more than fifty sugar estates, with an area under cultivation of 3000 hectares (about 7410 acres). The total yield in 1910 is estimated at 165 000 tons, representing a value of five million dollars, or 25 000 000 francs. There are no sugar refineries; about 80 % of the production is exported.

Scientific methods of cultivation and extraction are gradually gaining ground. Within the last four years fourteen estates have established chemical laboratories, and it has been proved that from 20 % to 25 % of sugar used to be lost, owing to deficient machinery.

In the two years 1909-1910 about a million of dollars (5 000 000 frs.) have been spent on modern machinery.

In 1906 the Government founded an Experiment Station for Sugar. It disposes of 3 hectares, or nearly 7.41 acres of land. Its work is to investigate the different districts of Peru most adapted to sugar cane production; to study its diseases, and organize experimental fields, etc.

G. MALFITANO and Mlle. A. N. MOSCHKOFF. **The Purifying of Starch.** — *C. R. de l'Académie des Sciences*. Paris, Tome 151, No. 19, Nov. 7, 1910, pp. 817-819.

The writers describe the process by which they succeeded in completely demineralising starch, and obtaining a very white substance of which samples of 10 gr., slowly incinerated, gave less than 2 mgrs of ash, due probably to the receptacles.

Common potato starch is most suited for this process. Other starches France cannot be treated with equal profit.

The starch above described is insoluble in cold water. Combined with the proper mineral compounds, it builds up again gummy or cellulose forms, and others soluble in cold water. It seems probable that all the modifications presented by starch in the natural grains and in paste are

due to the combination of the isolated substance with different mineral compounds.

L. PLANCHON and A. JUILLET. A Treatise on Certain Colonial Starches.

— *Extrait des Annales du Musée Colonial de Marseille*. 2^e Série, 7^e Vol., 1909. Barlatier, Marseille, 1910.

This volume of 154 pages, the first 28 of which are devoted to a critical study of starch characteristics, contains a list of a large number of tropical plants with the special characteristics of their feculas. The numerous illustrations show the different forms of starch grains, which are divided into seven groups:

- France** often compound.
- 1) *Taro* (1) *Group*: grains extremely small, uniform and angular.
 - 2) *Rice Group*: all the grains very small and angular.
 - 3) *Manioc Group*: grains differing greatly in size; never very large, often compound.
 - 4) *Leguminosae Group*: grains usually elongated; the *hilum* in a ramified slit.
 - 5) *Arrowroot Group*: grains flat, single, and more or less elongated.
 - 6) *Yam Group*: grains similar to the preceding, but extremely transparent.
 - 7) *Palmaceae Group*: grains very large, polymorphous, very characteristic.

The fecula of the *Eleocharis* (2) has no place in these groups, because of its irregular form. It might be taken as the type of a group including the chestnut and horse-chestnut.

For each fecula the form and size of the grains were noted, their reaction with iodine, with potash, and with guaiacum tincture; their possible confusions with other feculae, etc.

PAROW. The Value of different Varieties of Potato in Starch Manufacture.

(Welche Kartoffelsorten werden hauptsächlich in den Stärkefabriken verarbeitet und wie wird über die Verarbeitung der Sorten geurteilt?)
Chemiker-Zeitung. Cöthen, Nov. 8, 1910, No. 133, p. 846.

Germany The results obtained from 97 factories are here given as to the relative value of different kinds of potato in the manufacture of starch.

(1) The name *Taro* is properly applied to the fecula of the *Colocasia esculenta*, but it is also given to the *Arum Dracuntium* — a name given to different plants by various authorities (Ibidem, p. 127). [Ed.]

(2) The *Eleocharis*, known on the market as MA-DE, (*Eleocharis tuberosa* Schult.) or BOTNANG (*Eleocharis plantaginea* Rob. Brown) belongs to the cyperaceae of the East Indies and Madagascar. [Ed.]

Wohltmann gave good results, and next in order are: *Maercker*, *Silesia*, *Imperator*, etc.

G. F. RICHMOND. **Philippine Fibres and Fibrous Substances: their Suitability for Paper Making.** — *Philippine Journal of Science. A. Chemical and Geological Sciences and the Industries*, Vol. V, No 4, pp. 233-255. Manila, 1910.

An experimental cutting for determining the exact average commercial yield of bamboo (*Schizostachyum mucronatum*, Hack) (1) was made under the supervision of the Philippine Bureau of Forestry as follows:

Locality: 3.1 miles (5 km.) southwest of Lamay, Bataan, 2 m. (3.75 km.) in a direct line from the sea.

Altitude: 250 ft. (80 metres).

Area of Plot: 0.24 acre (0.1 hectare).

Number of stems cut: 1075.

Length of stems: 25 ft. (7.5 metres).

Green weight of 1075 stems: 13 622 lbs (6,181 metric tons).

Air-dry weight of 1075 stems: 7766 lbs (3,524 metric tons).

The bamboos were cut on Sept. 17, 1909, at 1 ft. 6 in. (0.5 metre) from the ground on fairly representative land.

Philippines

On Oct. 25 twelve bamboos over 30 feet (9 metres) in length were cut, and gave the following weights:

Average green weight of each stem 15.8 lbs (7.2 kg.).

Average air-dry weight 8.8 lbs (4 kg.).

Average, minus the nodes 8.2 lbs (3.75 kg.).

Comparing these with the preceding data, it is seen that 0.247 acres (0.1 hectare) would yield 8816 lbs (4 metric tons) air-dry material free of nodes representing 1075 stems. This weight will produce approximately two short tons (1812 kg.) of pulp.

The best results were obtained with "two-year-old bamboos," or shoots which had two full seasons' growth. These lose about 35 per cent of their weight on being dried in the air, and contain about 9 per cent of nodes. Experiments show that the soda process is preferable to the sulphite process.

The conclusion reached is that a soda pulp mill costing 200 000 dollars (1 000 000 francs) and producing daily about 20 tons could produce unbleached air-dry bamboo fibre at a maximum cost of 21 dollars (105 francs) per short ton f. o. b. Manila.

(1) In the *Index Kewensis* and its Supplements, up to 1908, we find 18 species of the genus *Schizostachyum* (Gramineae), but the species *S. mucronatum* is not mentioned. It is indigenous to the Malay Islands. [Ed.].

New Method of Manufacturing Cellulose from Straw and other Vegetable Substances. (Nuevo sistema de fabricacion de celulosa por medio de la paja y de otras sustancias vegetales), — *Revista de la Union Industrial Uruguaya*. Montevideo, Julio 1910, N. 178, pp. 2752-2753.

This new method can be applied to all the substances hitherto used for extracting cellulose, viz. hemp and flax, straw of wheat, rice, rye, oats, barley, maize, cotton, bamboo, white wood in general, and agave fibre.

The advantages are two:

- 1) The utilisation of the vegetable organic acids (chiefly oxalic acid), which the old system wasted.
- 2) A distinct saving in the cost of manufacture, by indefinite use of the same alkaline solution.

The disintegration of the vegetable tissues produced by inoculation with micro-organisms takes place much more quickly, with a consequent saving of time in manufacture.

The different stages of the process are enumerated as follows:

- 1) Trituration of the substances from which cellulose is to be extracted.
- 2) A three hours' maceration in acidulated water (which dissolves gums, chlorophyll, albuminoids, etc.).
- 3) Neutralisation with alkali; another three hours' maceration, followed by thorough neutralisation.
- 4) Separation of the liquid, the paste being left in the vat.

The first step in the manufacture is the inoculation of the paste with a pure culture of micro-organisms capable of disintegrating the vegetable fibres. Each time this operation is repeated, the liquid previously used is again employed. When the disintegration is sufficiently advanced, the liquid is drawn off.

5) Washing the paste with warm water. It is then taken out of the vat and put in closed vessels, where it is treated with an alkaline solution and a current of steam. The organic acids in the paste are thus transformed into soluble salts. These are removed by the alkaline solution and by the water produced by the condensation of the steam.

6) The mother liquid having been drawn off, the paste is ready for the usual treatment, namely: extension, washing and bleaching.

7) The liquid after being drawn off is treated with lime, which by precipitating the organic acids restores the alkali; and the water can then be again used as before.

The organic acids are isolated from the salts of calcium in the usual way.

M. P. NEUMANN and K. MOHS. **German Cereals and their Flour.** (Zur Kenntniss des deutschen Getreides) — *Mitteilungen aus der Versuchsanstalt für Getreideverarbeitung. Zeitschrift für das gesammte Getreidewesen*, pp. 187-191; 208-215; 231-238, Aug.-Sept. and Oct. 1910. Berlin.

The *Versuchsanstalt für Getreideverarbeitung* (Experiment Station for the Preparation of Cereals) publishes a report containing an examination of 26 types of German wheat, specifying:

- a) the variety, and whenever possible, whether of the first or of the second reproduction;
- b) its origin;
- c) the quality of the soil where grown;
- d) the quantity and kind of manure per hectare (2.47 acres);
- e) the previous crop;
- f) the manure employed for the previous crop;
- g) climatic conditions during the periods: 1) of growth, 2) of maturity, 3) of harvest;
- h) the yield per hectare, varying from a minimum of 16 metric quintals to a maximum of 35, with an average of 25.5 metric quintals per hectare.

With these varieties two types of meal were prepared: a first grinding (Ausmahlungsgrad 0.30 %) and a second grinding (31-70 %). Both these meals were submitted by careful experiment to the determination of the hydration "constant."

The first grinding was kneaded with milk, the second with water; and a certain amount of sugar was added according to practice.

The amount of gluten in the two types was determined, the figures given referring to the dry meal.

The percentage of gluten in the 26 varieties of wheat was as follows:

	Gluten		Proportion dry: damp
	damp	dry	
First grinding 0.30 %			
maximum	36.4	12.7	
minimum	24.0	7.5	
average	32.0	10.1	1:3.2
Second grinding 31-70 %			
maximum	40.7	13.8	
minimum	24.6	8.3	
average	33.7	11.1	1:3.0
Milled right through 0.70 %			
average	33.0	10.7	1:3.1
In the experiments of 1908:			
average	30.0	10.0	1:3.0

Germany

As the results recently obtained fairly agree with those of 1908, the given figures may be considered to represent the average gluten content of German wheats.

The best meals of the first grinding and the inferior ones of the second show a considerable quantitative difference in gluten; thus if the gluten content of the meal 0.30 be put at 100, that of the meal 31.70 is found to vary between 102 and 120. It was hoped at first that from these variations might be deduced a certain constant relation between the quantity of gluten in the two types of meal and the wheat varieties analysed; it was found however to be quite irregular; the larger and smaller differences are not peculiar to any special varieties, neither has the quantity or quality of gluten anything to do with them.

On the other hand, there is a certain constant difference between the quality of gluten found in the meals 0.30% and of that in the meals 31.70 per cent.

Thus, if the gluten of the first grinding is pale yellow, very extensible, but soft and non-elastic, then the gluten of the second is usually darker, firmer, more elastic and less extensible.

If the meal 0.30% contains dark, inferior gluten, the same kind, especially as regards its consistence, is generally found in the meal 31.70%.

The gluten of the meal 0.30% nearly always combines better with water than that of the meal 31.70%; consequently in the former the dry gluten stands in a higher proportion to the damp than it does in the latter, the figures being 1:3.2 and 1:3.0.

The analysis of the 26 wheat varieties is presented in a table giving the following specifications:

- a) the quantity of dry gluten in the two flours 0.30 and 31.70;
- b) the difference between these two quantities;
- c) the proportion of dry gluten, reckoning at 100 the gluten content of the meal 0.30;
- d) the percentages of damp gluten in the meals 0.30 and 31.70;
- e) the difference between the above percentages;
- f) the proportion of dry to damp gluten;
- g) the specific qualities of the damp gluten;
- h) the relative value of the wheats for panification.

The results obtained show that the volume of 400-440 cubic centimetres to 100 cc. of flour indicated by Messrs. Neumann and Mohs and by Schneidewind for a normal loaf is sufficiently correct. They think however that for loaves made from the first grinding a slightly smaller ratio of volume is to be expected, about 400 cubic centimetres to 100 grammes of meal.

It does not appear from the experiments that there is any definite proportion between the gluten content of the flour and the volume of bread.

The volume does not vary in proportion to the gluten content, but flours which are very poor in gluten seldom develop sufficient volume of bread.

As regards quality, in ten cases soft gluten corresponded to insufficient volume, resulting also in three cases where the gluten was firm. On the whole it seems that soft gluten must be considered as undesirable for panification, and elasticity and firmness of gluten must be the first desiderata, extensibility coming second.

Considering the wheats with reference to where they were grown and to the bread value of the flours obtained, we find 8 of the 26 varieties analysed clearly insufficient; 7 yielded flour barely up to the mark, and 11 fulfilled all the conditions for good panification.

The typical German wheats yielded the best flours, while selected varieties, such as the *Criewener*, the *Strube Squarehead*, the *Svalöf Squarehead*, the *Sheriff Squarehead*, the *Winterschnurweizen*, and the *Wetterauer Fuchswitzen*, gave the flours least suitable for panification, although the bread was extremely white and fine. They contained less gluten, and yielded less volume, (about 350 cc. to 100).

Almost all the ordinary German wheats of the second grinding turned out such dark coloured loaves that their commercial value was considerably impaired; these meals are better used as blends, and as a rule it may be said, that all those meals which baked by themselves give inferior bread can be very well and usefully employed as blends.

Therefore, although the specially selected varieties (Squarehead) are, as we have seen, distinctly inferior to the typical German wheats as regards panification, nevertheless they have certain points of superiority which cannot be denied. And from the agricultural point of view, the fact that they give a higher yield per hectare is sufficiently important.

Of the 26 kinds of wheat under examination, the varieties specially selected for intensive cultivation gave an average yield of 28.7 quintals per hectare (2.47 acres); whereas the ordinary German types only yielded 22.7 quintals per hectare.

Now, since in commerce there is no essential difference in price between these two classes of wheat, (to be explained by the fact that most meals are blended), it is clearly to the farmer's advantage to choose, as far as possible, the selected varieties rather than the ordinary ones, because of the much higher return that they give.

Further researches must be devoted to the task of finding out the causes which in certain varieties of wheat induce the formation of soft, less firm gluten; but the present investigation makes it probable that this peculiarity chiefly depends on the variety itself. After this, the problem will be to determine by what treatment it may be possible to modify the gluten at least so far as to prevent inferior panification. Two courses present themselves:

a) to take those ordinary types which are specially good for panification, and subject them to intensive cultivation; or:

b) to continue the process of selection on already selected varieties.

It is much to be hoped that the experiments now being prepared by Messrs. Neumann and Mohs will decide this important question.

H. KUHL. The Effect of Microorganisms on the Quality of Bread and Flour. (Der Einfluss niedriger pflanzlicher Lebewesen auf die Beschaffenheit des Mehles und Brotes). — *Die Mühle*, 4 Nov. 1910.

Germany

Under very moist conditions, bacteria develop in flour more easily than moulds, whose growth they seem to impede. Moulds, on the contrary, predominate in flour containing less humidity. In damp years, it is of the highest importance to note the water content of flours, which should never exceed 16% if the development of microorganisms is to be prevented. It is therefore very necessary that wheat should be protected from damp before grinding, especially in wet seasons, for many moulds and bacteria develop owing to neglect of this precaution, and cause deterioration in the quality of flour and bread.

Dr. BUCHWALD. Measures against the Meal-Moth. (Bekämpfung der Mehlmotte). *Zeitschrift für das gesamte Getreidewesen*, Sept. 1910.

Germany

Dr. Buchwald attests the efficacy of the application of Rollin varnish to mill-machinery for getting rid of the Meal-Moth (*Asopia farinalis*). This varnish, even when recently applied, does not cause the flour to adhere to the surface of the machinery.

SCHNEIDEWIND. The Effect of Manure on the Baking Properties of Wheat (Einfluss der Düngung auf die Backfähigkeit des Weizens). — *Landw. Jahrbücher*, Bd. 39, 1910. *Zeitschr. für das gesamte Getreidewesen*, 10 Oct. 1910.

Experiments made on this subject lead to the following conclusions:

Germany

1) Wheat with the best baking properties has always been obtained from soil where the manure of the preceding crop (potatoes) consisted of stable manure without the addition of nitrogenous manure for the wheat. The slow action of the stable manure had a favourable influence on the quality of the crop.

2) Nitrogen in the form of nitrate of soda was beneficial in the dry year 1909, but harmful in the wet year 1908, causing the gluten to be too soft. It should however be observed that in ordinary agricultural operations the amount of nitrate of soda used is less than in these experiments.

3) Phosphates and potash fertilisers have always had a good effect upon the baking properties of wheat.

4) These do not depend upon the gluten content, for flour from wheat grown on soil which had not been treated with nitrogenous manure for 8 years, only contained 5.69 % of gluten in 1908, and 6.13 % in 1909, but gave excellent results in baking.

It is therefore not the quantity, but the quality of gluten which causes wheat to make good bread. The quality of the gluten depends upon the kind of manure, and upon the atmospheric conditions of the season.

W. SCHLUTER. **Experiments in Bleaching Flour in Canada.** (Kanadische Mehlbleichversuche). — (*The North Western Miller*. Aug. 10, 1910). *Zeitschrift ges. Getreidewesen*, October 1910.

The treatment of flour with peroxide of nitrogen produced by electricity makes it whiter, and improves its general appearance. The colour obtained is, however, by many manufacturers, considered inferior to the yellowish hue of flour which has aged naturally.

Canada

These experiments prove that the bleaching process slightly diminishes the capacity of a flour for absorbing water.

In baking, the volume is slightly increased, particularly in the case of new wheat, for bleaching is an artificial aging process, but it cannot equal the effects of time.

E. W. ROCKWOOD. **Digestibility of Bleached Flour.** — (*Journal of Biological Chemistry*, 1910, S. 327-340); *Journ. of the Chemical Society*. London, Abs. Nov. 1910, II, 975.

Experiments in the artificial digestion of unbleached flour and of flour treated with peroxide of nitrogen have proved, not only that the bleaching process does not lessen the digestibility of flour, but in some cases even increases it.

United States

E. FICKENDEY. **On the Use of Palm-oil as Food.** (Ueber die Verwendungs-fähigkeit des Palmöls als Speisefett). — *Der Tropenpflanzer*, 14 J., N. 11, pp. 566-570. Berlin, Nov. 1910.

Palm-oil has not hitherto been directly used as food, on account of its great acidity, caused by the catalytic property of an enzyme occurring in the fruits of oil producing palms. It is now thought possible by proper treatment to extract a product which may be put on the food market.

Germany

To this end the following rules must be observed:

1) Only use perfectly fresh, ripe fruit.

2) Hinder the enzyme action by heating to 90°-100° C. in water, or steam.

3) Rapid mechanical treatment of the fruit.

D. BUFALINI. **Extraction of Olive Oil.** (Lavorazione delle olive). — *L'Istria Agricola*. Nov. 1910, N. 23, p. 562-566.

Italy:
Sicily

This is a description of a process which has long been used with excellent results in Calabria and Sicily, and consists in spreading slices of lemon underneath the mill-stone while the olives are being crushed.

The citric acid, which lemons contain in large quantities, facilitates the extraction and clarification of the oil, and imparts to it a very pleasant odour.

R. MARCILA. **Analytic Notes on Testing Oils and on their Absorption Spectra.** — *Annales des Fabrications*. Paris, 24 Oct. 1910, pp. 417-426.

Tunis

M. Marcila has made observations on Hüll's method of determining the iodine index, which gives very varying results according to the conditions of experiment, the iodine index of the oil, the surrounding temperature, and the age of the iodine solution. He has also studied Tortelli's thermoleometer, which has not the precision of direct methods, but will certainly be employed more and more in laboratories, on account of its rapidity and simplicity.

The examinations of various olive oils from the point of view of their absorption spectra, shows that the only substance which reacts is chlorophyll, and this is rather more abundant in Tunisian, than in French and Italian oils.

The different vegetable oils present no essential differences, nevertheless it seems possible to obtain useful data for the detection of the olive oil in mixtures.

N. S. PILLANS. **Buchu, an Essential Oil prepared in Cape Colony.** — A Preliminary Note on Cape Buchus, S. Africa. *The Agricultural Journal of the Cape of Good Hope*. Vol. XXXVII, N. 3, pp. 252-254. Cape Town, Sept. 1910.

South
African
Union:
Cape
Co ony

An essential oil, known in medicine as oil of Buchu, is extracted from the leaves of certain varieties of the genus *Barosma*: *B. crenulata*, *B. ser-ratifolia*, *B. betulina* which, together with other Rutaceae furnished with oil-glands, grow wild in the forests of Cape Colony.

The continued demand in the London market, and the rise of price, according to the most recent quotation, to 6 s 10 d (8,50 francs) per lb.

(0,453 kg.) has had a beneficial effect on the trade in this drug in South Africa.

It is well to mention that in spite of care in packing, and all possible dispatch in the transit of the leaves there is great loss of oil. Therefore it is advisable to set up distilleries in the Colony which would also allow of other Rutaceae being utilized, which although poor in oil, grow very rapidly and vigorously.

New Essential Oils. — *The Agricultural News*, p. 329, Oct. 15, 1910. Barbados, West Indies.

The leaves of the *Cinnamomum Tamala*, a tree which is common in South Africa, yield an essential oil of a lemon yellow colour with a scent like that of cloves, containing essence of cinnamon and of wood cassia.

Its sp. gr. at 15° C. is 1,0257. It is very like the essential oil of the *Cinnamomum Zeilanicum*. A new oil has also been obtained from the leaves of the guava (*Psidium guyava*) (1); it is of the same colour and has a slightly aromatic odour. Its sp. gr. at 15° C. is 0,9157 and it is soluble in 10 volumes of 90 % alcohol. An essential oil smelling faintly of peppermint, with a sp. gr. at 15° C. of 0,9701, has been extracted from the *Mentha silvestris*. It contains menthol, pulegon and phenol.

South
African
Union

Essence of the Wood "Paolo Amarello", (L'essence de bois « Paolo Amarello »). — *Bulletin Scientifique Industriel*. Roure, Bertrand fils, Grasse, Oct. 1910, p. 39.

It has not yet been possible to determine botanically the wood of this name sent from Brazil to the firm Roure, Bertrand fils.

It yields, on distillation, 0,41 % of an essence exactly similar in smell to that from linaloe wood, which it resembles somewhat in its physical and chemical properties, but contains a somewhat larger amount of ethers.

Brazil

(1) According to Dujardin Beaumetz and Egresse, *Plantes m  dicinales exotiques*, Paris, 1887, and Sir George Watt, *The Commercial Products of India*, London, 1908, the *Psidium guyava* is a not very lofty tree of the Myrtaceae family, originally from tropical and sub-tropical America. Its fruit is a berry about the size of a pear, the two varieties, the white and the red, differ by the colour of the flesh of the fruit. The white is called *P. pyriiferum*, Guava pear, and the red *P. pomiferum*, Guava apple.

The leaves and roots of these trees are used in Assam for dyeing, and in Bengal and in the United Provinces they are sometimes used as tanning material. [Ed].

JOHN COWAN. **Our Wasted Seaweed Resources.** — *Scientific American*, Oct. 29, 1910, Vol. CIII, N. 18 p. 336. New-York.

In general but little attention is paid to the utilisation of seaweeds and to the marine forests and gardens that fringe the sea coasts.

Along the coasts of New England, of the British Isles and of Western Europe seaweeds are used as fertilizers. In some countries they are used for litter and for stuffing mattresses. Japan alone among nations studies the utilisation of its seaweed resources.

Experimental planting on a small scale has been undertaken by the Japanese Government with encouraging results. The red laver (*Porphyra laciniata*) is extensively "planted" and manufactured into food products for domestic use. Its cultivation is very profitable, the crop annually being worth doll. 150 to doll. 160 per acre (1920 a 2052 frs. per hectare). The area of suitable submerged lands is limited and leased out by the local Governments. From 2250 to 2500 acres are planted annually, nearly all in Tokyo Bay and near Hiroshima.

The red laver grows abundantly along both coasts of the United States and also in Ireland.

Japan Of still greater importance is the seaweed of the genus *Gelidium*, used in the manufacture of *Kanten* or seaweed isinglass, which is largely exported by the Japanese.

In 1903 there were in Japan five hundred establishments turning out about 3 000 000 pounds (1 360 000 kg.) of isinglass selling at about 15 cents a pound (2,75 frs. per kg.). It is used in making jellies, soups, sauces, in clarifying wines, in the stiffening of warp in silks and in the manufacture of paper. Under the name of agar-agar it is used almost exclusively as the culture medium in bacteriological work.

The *Porphyra perforata* is a red seaweed collected along the shores of Ventura County in California; it is baled like hay and exported to China, there to be manufactured into Chinese moss products similar to *Kanten*. The most abundant of all seaweeds are the *Kelps* (1) distributed along every coast. From these the Japanese prepare *Kombu* which enters into the dietary of every family in Japan.

From the kelps, iodine has been manufactured, chloride of potash, algin, cellulose, dextrin, mannite, etc.

Algin is a very remarkable substance that seems capable of an indefinite variety of applications in the arts and industries. It has 14 times the viscosity of starch and 37 times that of gum arabic.

(1) Under the name of *Kelps* are included: *Laminaria digitata*, *L. stenophylla* which are washed up on the shore, *Fucus serratus*, and *Ascophyllum nodosum* which are gathered.
[Ed.]

In Massachusetts (U. S. A.) there is a seaweed industry of commercial importance with an average annual output of about 800 000 lbs (362 000 kg.) of products valued doll. 25 000 (129 000 frs.) used chiefly in making jellies and confectionery, in the clarifying of beers, etc.

L. GUIGNARD. **Renewing old Corks.** — *Revue Scientifique*, Nov. 1910, Paris, p. 628.

The experiments which have been made⁷ of late years, at the suggestion of M. Lucas Championnière, in the disinfection of books, have brought to light the advantages of gaseous antiseptics, especially methanal, for the sterilisation of substances that are difficult to penetrate.

One of the best of these processes is that made known by M. Perdrix, which consists in generating the antiseptic gas in a closed stove by heating trioximethylene of commerce to 100°. At the request of M. Guignard, M. Perdrix made experiments with this process on corks collected from sewers, which were completely sterilised after being acted on by the antiseptic gas for an hour; the corks have to be dried first; they remain impregnated with methanal for several days.

France

It seems more practical to have recourse to an equally efficient but simpler method by using the disinfection stove which sterilises by *steam under pressure*. This apparatus causes the sterilising fluid to penetrate porous objects by a series of evaporations and condensations which rapidly expel the air contained in them.

The following rules may be formulated as a basis for allowing the sale of old corks:

1) Corks gathered in the public streets, from the Seine, from running waters and from sewage, must not be sold in the usual way, unless they have first been subjected to the action of steam under a pressure of at least 2 atmospheres for a minimum period of 20 minutes;

2) Sterilised corks may be whitened, on the express condition that the chemical substances used for bleaching them are afterwards completely eliminated;

3) All such corks put up for sale must be labelled: *sterilised and renovated corks*.

G. H. FR. PAPE. **Utilisation of Peat.** (Herstellung eines zu technischen Zwecken geeigneten Rohmaterials aus Hochmoortorf). *D. R. P.* 227, 344, vom 20 Dec. 1908). — *Chemiker Zeitung*, Cöthen, Nov. 1910, No 141, p. 583.

Germany

The writer has discovered a new method for utilising peat. It is reduced to a powder and mixed with powdered amianthus or minerals

containing it (silicates of magnesia). The raw material thus obtained can be used for the manufacture of insulating substances, building materials and paving stones.

The Palm Hat Industry at Malaga. — *Office du Gouvernement générale de l'Algérie*, Paris, Nov. 1, 1910.

Spain Malaga is the seat of a palm-leaf industry. The leaves are dried and plaited into wide brimmed hats. The palm tree grows remarkably well in this part of Spain, owing to the favourable climate, and there is plenty of raw material for the trade. About 160 000 kg. of palm leaves are used every year in the manufacture of hats.

CHARITSCHKOFF. Seasoning Wood in Russia by Concentrated Brine. (Ueber das Imprägnieren des Holzes durch Salzsole in Russland). — *Chemiker Zeitung*, Jahrg. XXXIV, No 130, Cöthen, Nov. 1, 1910, p. 1159.

Russie This paper deals with the excellent results obtained by using concentrated brine to preserve railway posts and sleepers. The wood is kept for several months in special concentration tanks containing sea water. The system has many advantages, both from the economical and other points of view, as appears from the data supplied by the writer on the cost of preserving wood by chloride of zinc, creosote, etc. The following is the composition of the concentrated sea water:

	gr.	
Sodium chloride	136.41	per litre of water
Magnesium sulphate.	16.64	» »
Calcium chloride.	3.14	» »
Sulphate of lime	0.65	» »
Silica	0.03	» »
Oxide of aluminium & iron	0.05	» »
Organic matter	0.82	» »

M. TORTELLI and E. PIAZZA. Tests and Determination of Saccharine in Food Stuffs rich in fatty, starchy and albuminous Matter. (Sulla ricerca e il dosaggio della saccarina negli alimenti ricchi di grassi, amidi e albumine). — *Staz. Sperim. Agrarie Italiane*, Modena, 1910, vol. XLIII, fasc. VII-IX, pp. 563-576.

Italy The writers are of opinion that tests for saccharine and its salts are always extremely difficult and uncertain in products rich in amylaceous, fatty and proteic substances; and they present a new process which, apparently, can be applied to all food-stuffs that are usually sweetened with saccharine. The question of the specific reaction of saccharine is then treated, as well as that of dulcine or sucrole.

Protection of Olive Oil against Fraud. — *Bulletin Scientifique Industriel*, Roure Bertrand fils, Grasse, Oct. 1910, pp. 66-75.

This is a history of the conflict of interests between the manufacturers of oil from seeds and the producers of olive oil in France. This competition has led to the revision of the Customs duties, which favoured the seed-oil manufacturers, and 2 million francs are to be devoted annually by the Ministry of Agriculture for distribution in bounties and other encouragements for the cultivation of the olive.

Three systems were under discussion, the bounty per plant, the bounty per hectare and the bounty for the crop. The first system was set aside, and the Budget Commission will decide between the other two.

Competition is keenest in the alimentary oil trade, where, under the ambiguous names of superfine oil, extra-superfine oil, superior oil, table oil etc., oil from seeds is sold, while for nearly every other alimentary product the true name is obligatory.

Better than bounties for the protection of olive oil producers would be the labelling of cotton-seed and ground-nut oil for the table with their true name. The Ministerial circular of July 26th, 1910, authorising the taking of samples of olive oil for the purpose of repressing fraud, has only aggravated the situation, by subjecting olive oil producers alone to the attendant annoyances.

France

Agricultural Engineering and Farm Machinery and Implements.

Agricultural Implements and Machinery in Turkey. — *The Board of Trade Journal*, London, 3 Nov. 1910.

Agricultural machinery is admitted in Turkey duty free. Steam ploughs and threshing sets are not in great demand. One unfortunate experience some years ago with a threshing set has prejudiced the native mind against them.

Horse rakes can find no market for a religious reason; they clean the ground too thoroughly and leave nothing for the gleaners. British made ploughs, after keen competition, are gradually winning the first place.

Turkey

Importance of the Trade in Agricultural Machinery in Uruguay. — *Feuille d'Informations du Ministère de l'Agriculture*. Paris, Oct. 25, 1910.

The importation of agricultural machinery in Uruguay is already considerable, and is certain to extend. Ploughs, harrows, weeding and reaping machines, rakes, haymaking and threshing machines, etc., are imported from North America, England, and Germany.

Uruguay Uruguay farmers prefer to buy cheap machinery and renew it frequently, rather than highly improved machines which would be practically useless for lack of the skilled labour necessary for their management.

Communication by land and water is being improved and extended in Uruguay, and will diffuse modern methods for the cultivation of its fertile lands and open increasing markets for agricultural machinery.

Stone Gathering Machines, — (*Natal Agricultural Journal*, Aug. 1910, p. 207); *The Agricultural News*, vol. IX, N. 222, Oct. 29, 1910, p. 348. Barbados.

Barbados This report deals with trials made with various machines for gathering stones. The best appears at present to be that invented by Messrs. J. and R. Forgan, of Port Pirie, which obtained 83 marks out of a maximum of 100. This machine, which requires a 5-horse team and one man to work it, passes over large stones and tree stumps without injury, and is capable of clearing from 8 to 10 acres ($3\frac{1}{2}$ to 4 hectares) a day.

L. DUBOIS. Mower-Reaper and Binder combined. — *Journal d'Agriculture pratique*. Paris, N. 46, Nov. 17, 1910, pp. 632-633.

France: Deux Sèvres M. Fr. Defaye of St.-Georges-de-Noisné (Deux-Sèvres, France) has endeavoured to transform an ordinary two-horse mower into a simple reaping and binding machine, without rakes and with a narrow cut, adapted to small fields or rough ground. The apparatus weighs 273 kg. and costs 575 frs. Farmers who have seen it at work have appreciated its efficiency. Requiring only two horses or oxen, it is well suited to small farms.

A New Drier for Seeds. (Ein neuer Schachttrockner). — *Zeitschr. f. d. gesamte Getreidewesen*, 2 Jahrg. n. 9. Berlin pp. 222-225. Sept. 1910.

Germany Prof. J. F. Hoffmann has invented a shaft-shaped drier [*Schachttrockner*] for seeds, which seems to fulfil all the conditions of such apparatus: it has been patented by the *Versuchs- und Lehranstalt für Brauerei*, of Berlin.

A New Milking Apparatus — *L'industrie du Beurre*. Niort, N. 43, Octobre 23, 1910.

Denmark Mr. Jons Nielson, a Danish engineer, has invented a very practical apparatus for milking cows automatically. It consists of two plates worked

by a spring and exerting an equal pressure, regulated at will, on the teat of the cow. The milk is filtered through a cap fitted to the teat of the cow and falls into a vessel suspended from the animal's body.

The apparatus is constructed entirely of aluminium and admits of the utmost cleanliness. It is already extensively used in Denmark.

RIPERT. **Refrigerators for the Carriage of Agricultural Produce.** —
L'Agriculture commerciale. Paris, Nov. 27, 1910.

The method usually adopted for perishable agricultural products is to place them in refrigerator cars, where they are refrigerated whilst travelling. But both theory and practice have demonstrated the great advantage of refrigerating certain commodities as soon as possible after harvest or slaughtering. By the old system, the warm products are put directly into the cold, damp air of the refrigerator car; by the *Prerefrigeration* system they are first subjected on the spot to a current of exceedingly dry and cold air. In order to diffuse the prerefrigeration system, the United States Department of Agriculture has constructed a special transport demonstration car and American farmers have been enabled in this way to compare the two methods. It has been found that not only can vegetables treated in this way be forwarded to much greater distances and arrive in better condition, but many of them, tomatoes, for instance, may be gathered ripe instead of green, as hitherto.

United
States.
France

It would be well to construct in France cold storage stations like those of the United States in most of the agricultural centres. They should be near, or better, inside the railway stations. Some might even be movable, so that they could be taken from place to place according to the season.

PLANT DISEASES
NOXIOUS INSECTS AND OTHER PESTS.

OFFICIAL COMMUNICATIONS

THE RUSSIAN DEPARTMENT OF AGRICULTURE.

A new Disease of the Cucurbitaceae. — At the present stage of Phytopathological knowledge, it is of the highest importance that the appearance of new cryptogamic diseases, as well as the recrudescence of epidemics affecting cultivated plants, should be notified, without delay, to the Stations and Laboratories of vegetable pathology throughout the world.

This would permit of preventive measures being devised and carried out in time.

The International Institute of Agriculture is in a position to render the greatest help in this matter by devoting a section of its Bulletins to Vegetable Pathology, in order that such States as are represented, may be kept in touch with all questions concerning the statistics and fluctuations of these diseases.

In the hope that other Institutions of Vegetable Pathology will view the matter in the same light, I venture to draw attention to the work which has been done this year at the Institute of Vegetable Pathology in Saint Petersburg in recognising and studying a new disease of the cucurbitaceae. At the beginning of August, specimens of cucumber plants were sent to us from the Government of Yaroslaw, which is, as is well known, an important centre of Market Garden Industry. It appears, according to the description of the disease given by the Public Instructor of that district, that the plants attacked, wither, or decay, and that the beginning of the malady is characterized by complete arrest of development, and by a slight drooping of the leaves, which, however, retain their colour for some time, and show no traces of direct injury.

The root also remains healthy, and the change is at first limited to the base of the stalk, or crown of the root, which disintegrates and begins to decompose.

The contagion spreads rapidly from one plant to another, and soon makes large patches extending outwards, recalling the patches in vineyards familiar to wine-growers and due to *Phylloxera*.

The importance of the disease may be estimated from the report of the local Public Instructor, stating, that the infection had spread to $\frac{1}{6}$ or even $\frac{1}{4}$ of all the cucumber crops of the district.

Study of the disease revealed in the root crown of the plant attacked, a felt-like, septate, white mycelium which, invading all the conducting tissue, forms a kind of plug, and intercepts the rising of the sap in the stems.

This explains the sudden withering from inanition of plants which seemed perfectly healthy.

Later, the felted mycelium forms, on the exterior of the root-crown, tufts more or less abundant according to the humidity of the surroundings, and may also occur on the stalks, leaves, and even on the shrivelled fruits which soon decay.

From this summary description, it will be seen that the disease is strikingly like the *Carnation disease* at Antibes, reported by MM. Prillieux and Delacroix, the *Disease of the Cotton plant* of Egypt, America and S. Russia, and the *Flax disease* of America, Belgium and N. Russia. In short, it belongs to a group of diseases known in Vegetable Pathology, as *Disease of the root-crown*, and generally due to the attack of a fungus whose conidial form is represented by the *Fusarium* type which consists of fusiform, hyaline, transversely septate bodies, bow shaped and pointed at the extremities.

The mycelium which infests cucumber plants, bears conidia of the above type, and it is clear that we have here an ascomycete fungus of which *Fusarium* forms a stage in the cycle of development.

The *Fusaria* are, as is well known, very variable, which renders their identification difficult, and the more so, as no monograph (1) upon this group exists.

The descriptions of the different known species of *Fusarium* did not agree with the type found on cucumbers until, on comparing herbarium specimens, we found in Thuemen's *exsiccata*, *Mycotheca Universalis* n. 376, *Fusarium lagenarium* Pers., which agrees in every respect with the species in question, but it is badly described and little known; it had only been found on decomposing cucumber fruits, and never on the root-crown (See Rabenhorst-Winter, Vol. IX, p. 579). Our *Fusarium* occurs on the stems, leaves and fruit, therefore its presence on the crown of the root must be an adaptation.

We made pure cultures of this *Fusarium*, and also artificial infection

(1) See page 356.

experiments, in order to study the complete cycle of development of this fungus, and the details of its life history. But for the moment, it seems well to draw public attention to this enemy of the cucumber, which as we have seen is capable of causing much damage to the Market Garden Industry.

Of late, diseases of the root-crown of plants belonging to the most varied species have gained ground, and are a source of grave danger.

Although the *Fusaria* are not usually looked upon as true parasites, but rather as *hemisaprophytes*, or *facultative parasites*, only attacking weak plants, or those that have sustained external injuries, by means of which spores enter, yet their rapid and epidemic development constitutes a danger to which it is well to draw attention by mentioning their two chief methods of dissemination.

First by means of the soil. The mycelium of *Fusarium* which attacks the crowns of roots, grows rapidly in the ground where it may develop for a long time, and thus contaminates the soil.

This fact explains, on the one hand, the more or less rapid development in patches of these diseases, and, on the other their perpetuation from year to year, if the same crop is unwisely grown on the same soil many years in succession.

In order to eradicate these evils in the localities which they are devastating, it is necessary to adopt a system of rotation which insures an interval of at least 6 years between crops of the same kind on the same ground.

Should this for economic reasons be impracticable, the best course is the disinfection of the soil by means of formol.

The second way in which these maladies are propagated is through seeds.

By centrifugal treatment of seeds it is easy to discover, in the sediment, a greater or less quantity of the spores of all kinds of parasites and saprophytes, which occurring on the surface of the seeds germinate at the same time and thus infect the new crops.

In gathering the seeds of infected cucumbers, or even of neighbouring plants, many *Fusarium* spores are to be found on them, which is easily understood, as cucumber fruits touch the contaminated soil.

To escape the danger of the spread of cryptogamic diseases by means of seeds, disinfection with formol is in all cases much to be recommended.

It is sufficient to place the seeds for two hours in a solution of commercial formol diluted with 300 times its volume of water (0.15 %) when after being dried they can be sown.

This process is in no way harmful, but affords complete protection against the invasion of parasites, and cannot be too highly spoken of, as has been shown by its application on a large scale in Russia.

It remains to be seen if *Fusarium lagenarium* confines its attacks to cucumbers.

The species, as a rule, does not seem rigorously confined to a specific host-plant, and is not particular in its choice of substratum. *Fusarium vas-infectum*, for instance, attacks very different plants.

At present, we are without data as to the substratum selected by *Fusarium lagenarium*, but in every case, it is wise to introduce into the cycle of the above-mentioned rotation of crops, only such plants as are, generally speaking, little subject to disease of the root-crown e. g. Cruciferae, Umbelliferae, Beetroot, but in all cases eliminating all Cucurbitaceae.

This last recommendation is the more important, since we have just received from the neighbourhood of Moscow, melon plants attacked by a disease of the root-crown identical with that affecting the cucumbers, and due to a very similar *Fusarium*.

This latter disease is still being studied, and the result of the investigations will be the subject of a special memorandum.

A. DE JACZEWSKI

Director of the Institute of Vegetable Pathology
of the Russian Department of Agriculture.

INTELLIGENCE

Non Parasitic Diseases and their Control.

Decay of Ornamental Plants Attributed to the Tarring of Roads, —
Scientific American, Vol. CIII, No. 16, Oct. 15, 1910, p. 291.

At Sioux City, Iowa, in the United States, the Municipal authorities have given up tarring the roads in the public gardens, on account of the withering of the grass, shrubs and trees near places where tar has been used.

The same deleterious effects of tarring the pathways have been observed also in the Bois de Boulogne, and it is thought that the mode of applying the tar may be responsible; the vapours which rise from it are certainly injurious to vegetation.

United
States
and
France

C. v. TUBEUF. **Diseases and Decay of Plantations of Scotch Firs.** (Erkrankung und Absterben von Kiefernbeständen). — *Naturwissenschaftliche Zeitschrift für Forst- und Landwirtschaft*, Heft 11, Stuttgart, Nov. 1910, p. 529.

Serious decay has been observed during the past few years in the plantations of *Pinus sylvestris* L. in the district of Erling, near Munich. The disease shows itself by the yellowing and fall of the leaves and the retarded growth of the tree, which soon perishes and is found to be full of a variety of insects and fungi. The pines attacked were from 35 to 40 years old. The affected patches looked like yellow islands in the midst of the surrounding trees, still green and healthy. Investigation showed both leaves and roots to be free from parasites; but the roots were very superficial, and their growth and development absolutely abnormal.

These observations led M. von Tubeuf to seek the cause of the disease in the nature of the soil, which is very clayey, impermeable and heavy. The unequal resistance of the pines to the disease would appear to be accounted for by a varying arrangement of the strata of the soil.

Germany
Bavaria

Parasitic Diseases of various Plants and Means of Prevention and Cure.

- I. ZELLNER. **Relation Between Parasitic Fungi and Host Plants from the Chemical Point of View.** (Chemische Beziehungen Zwischen höheren parasitischen Pilzen und ihrem Substrat. Zur Chemie der höheren Pilzen, VI, Mtl.). — *Zeitschrift für angewandte Chemie*, XXXII, J. H., 43, p. 2051, Leipzig, Oct. 28, 1910; *Wiener Monatshefte*, 31, 635, 641; *Journal of the Chemical Society*, No DLXXVI, II. 887, Oct. 1910.

A comparative examination of the chemical composition of parasitic fungi and host plants has shown that the composition of the parasitic fungi depends in the first place on their specific nature as they have many chemical characteristics in common with saprophytic fungi, but at the same time their composition is modified by that of the host plants. Thus the parasitic fungi of woody tissues contain diastases and maltases.

Germany
Austria

According to M. Zellner, the fungus acts in three different ways on the host:

- 1) It utilises nutritive substances of the host, giving useful substances and other advantages in exchange;
- 2) The fungus dissolves the insoluble constituents of the host with its special ferments, and absorbs them;
- 3) The parasitic fungus poisons the host plant by the secretion of toxic substances.

***Aegerita Webberi*: A Fungus Parasitic on *Aleyrodes Citri* and *A. Rubifera*.** — See page 373 of this *Bulletin*.

- G. TRINCHIERI. **On a Laboulbeniacea hitherto unknown in Italy: *Trenomyces Histophthorus*.** Chatton and Picard. (Intorno ad una Laboulbeniacea nuova per l'Italia: *Trenomyces histophthorus*. Chatton et Picard). — *Bullettino dell'Orto Botan. della R. Università di Napoli*, tomo II, fasc. 4°, Napoli, 1910, pp. 525-529.

Italy

A note on *Trenomyces histophthorus* Chatton and Picard, a fungus parasitic upon *Menopon Pallidum*, Nitsch, the common fowl louse, hitherto unknown to Italian mycology.

The Oïdium of the Oak and the Food of the Toussah Silk-worm. —

See page 321 of this *Bulletin*.

- A. F. PAVOLINI. **The Development of Aecidium in the "*Uromyces Dactylidis*" Otth.** (Sullo sviluppo dell'ecidio nell'*Uromyces Dactylidis* Otth.). — *Boll. della Soc. Bot. Ital.*, Firenze, Maggio-Giugno, 1910.

Recent investigations on the discussed question of the sexuality of Uredinaea were concerned with the development of the aecidium, in the cells of which have been observed the important phenomenon of two connected nuclei which give birth to the mother-cells of the aecidiospores.

M. Pavolini describes the principal phenomena observed in the development of the aecidium *Uromyces Dactylidis*, and concludes by saying that it is only possible to be certain for the present that within the cells which give birth to bi-nuclear aecidiospores a fecundating process takes place which consists in the two nuclei of different cells uniting in a single cell, which thus exhibits the essential characteristics of a fecundated egg-cell. The two connected nuclei in this cell remain separate throughout the successive myceliums and successive forms of spores until the development of the teleutospore, in which they become a single nucleus.

Italy

- G. ARNAUD. **The Fumago of the Vine and of Cultivated Trees.** (La Fumagine de la vigne et des arbres cultivés). — *Progrès agricole et viticole*, No. 48, Montpellier, 27 Nov. 1910, pp. 655-57.

Fumago is a black felt-like covering produced on leaves by the presence of fungi which live at the expense of a sugary secretion due, probably, to insect attack (coccinellae and plant-lice).

The conidial form of the fungi resembles those of the *Smuts* of cereals.

There are different opinions as to the influence of Fumagi upon the health of vegetation. They are accused of intercepting the passage of the solar rays to the leaves, and of diminishing the air-supply by obstructing their stomata.

France

In the above paper, it is denied that Fumago injures plants by reducing their light.

For, in sunny positions especially, there is often excess of radiation, which sometimes causes physiological diseases such as the *brunissure* of the vine. Also the stomata cannot be obstructed, because most plants subject to the attacks of Fumago have the stomata on their lower surfaces. But this disease diminishes the ornamental value of certain plants and spoils the fruit of aurantiacae and from this point of view it is well to combat the fungi. The most radical method of doing this, is to destroy the cause of the evil, the coccinellae and plant-lice.

O. APPEL and H. W. WOLLENWEBER. **Basis of a Monograph on the Genus *Fusarium* Link.** (Grundlagen einer Monographie der Gattung *Fusarium* Link.). — *Arbeiten aus der Kaiserlichen biologischen Anstalt für Land- und Forstwirtschaft*, Bd. VIII, Heft I, Berlin, P. Parey—J. Springer, 1910, p. 207.

The writers of this monograph had previously limited themselves to giving a brief description of the essential and most apparent characteristics of the recently-discovered *Fusaria*. This slight description was quite inadequate for distinguishing the hundreds of species obtained, and it was thought that *Fusaria* are so variable that they cannot be distinguished by simple observation of their morphological characteristics. Greater importance has since been given to determination of the host plants on which different species of *Fusarium* have been found.

Before further investigating the diseases produced by the fungi, it was well to study the fungi themselves. It was essential first to distinguish the species according to morphological data, and to establish the necessary biological data for their precise determination.

Messrs Appel and Wollenweber show that the *Fusaria* are not nearly so variable as was thought, and that it is possible to distinguish the different species without giving special importance to their hosts, which, moreover do not offer sufficient certainty. These results are mainly due to the elaboration of certain hitherto neglected characteristics, such as the curvature, the constancy of the septations, the terminal and lateral formation of the conidia, etc. Artificial cultivation has a special importance in the study of these fungi.

F. C. v. FABER. **Infectious and Germinative Power of the Uredospores of *Hemileia Vastatrix*.** (Zur Infektion und Keimung der Uredosporen von *Hemileia vastatrix*). — (*Berichte der deutschen botanischen Gesellschaft*, XXVIII, 1910, pp. 138-147); *Botanisches Centralblatt*, Bd. 114, Wr. 18, Jena, Nov. 1, 1910, p. 462.

The writer has made some experiments at Buitenzorg (Java) on the infectious and germinative power of the uredospores of the *Hemileia vastatrix*.

The uredospores of this fungus germinate as well on the upper as on the lower surface of the leaf of the coffee plant, but infection occurs only on the under surface, through the stomata. The uredospores on the leaves of the host plant, when the conditions of moisture are suitable, emit short germinative filaments which penetrate through the stomata into the hypostomatic cavity, where they ramify abundantly between the tissue cells and inside them. If the plant is immersed in water, however, it cannot be in-

Germany

Dutch
East
Indies:
Java

fect, because the germinative filaments ramify without penetrating the cavities.

Uredospores germinate as well in the dark as in a faint light, as Burck has already pointed out; but a short exposure to intense light favours germination, although too long exposure injures the uredospores. Momentary exposure to intense light has an exciting effect, which is all the greater when the spores have been in the dark for a long time; the only parts of the spectrum which have this influence are the most refrangible parts, the uredospores remaining as if in the dark with regard to the other parts of the spectrum.

The blue-violet rays therefore have a beneficial effect on germination, provided the exposure be only momentary, but they kill the turgid spores if the latter are long exposed to their action.

The Creation of Disease-resisting Varieties: Potatoes; Cowpeas. (Création de Variétés résistantes aux maladies. Pomme de terre: Cowpeas). — See page 249 of this *Bulletin*.

The Disinfection of Seed. (Désinfection des Semences). — See page 238 of this *Bulletin*.

G. PRÉVOST. **An Experiment in Treatment with Nitrate of Silver.** (Un essai de traitement au nitrate d'argent). — *Progrès agricole et viticole*, Montpellier, 27 November 1910, No 48.

An experiment in combating mildew by treatment with a solution of nitrate of silver and soap was carried out on 10 rows of three different plots of grafted vines.

France

The method was suggested by MM. Vermorel and Dantony (1), but the results which were good at Villefranche, were not successful in this case.

Although the solution was applied three times a week, the leaves were much damaged by mildew, while 150 000 grafted vines of different varieties treated with acetate of copper, were almost free from the disease.

Prudence should therefore be observed respecting the new remedy, the efficacy of which has not yet been proved.

V. VERMOREL, E. DANTONY. **Salts of Silver against Mildew.** — *Progrès agricole et viticole*, No 48, Montpellier, Nov. 27, 1910, p. 651.

In reply to criticisms on their suggestion of the use of nitrate of silver and soap mixtures against mildew, the writers deny that they had any

France

(1) Messrs Vermorel and Dantony's mixture is composed of 20 grams of nitrate of silver and 300 grams of soap per hectolitre of water. [Ed.].

intention of generalising on the results of their experiments, and of advising the suppression of cupric treatments. They simply asked vine growers to *try* the new formula.

In any case, it would be premature to pass judgment on the value of the treatment with silver salts and soap since this formula was only brought forward at a time when the vines were already ravaged by the disease. Precise experiments extending over a longer period must be made before an opinion can be formed.

The preparation should contain an excess of soluble fatty soap, in order that the silver may be distributed equally over the organs of the vine and may adhere better.

DESFLASSIEUX. Mildew and Cochylis. Their Treatment with Bordeaux Mixture in a Medium of Iron Sulphate. — *Progrès agricole et viticole*, Montpellier, No 45, Nov. 6, 1910, pp. 566-570. (Extract from the *Bulletin du Syndicat Agr. des Pyrénées orientales*).

The writer reports observations made during the year on the use of mixtures against mildew and Cochylis, and remarks that only those growers who treated their vines with acid mixtures at a very early period were able to save their crops. He describes the preparation of these acid mixtures, and recommends an excess of copper sulphate in solution but not strong enough to burn the vines. He found that iron sulphate is most to be recommended as combining adherence and penetration.

France

A hydrate or a hydrocarbonate of iron is formed with lime or carbonate of soda, and if formed at the same time as the cupric precipitate, the two will mix and the iron will fix the copper. The hydrate of iron is transformed into a ferric hydrate or rust, which is very adhesive and penetrating. Iron sulphate is the only fixative which has a good effect on the growth of plants.

In the treatment against Cochylis arseniates are recommended before flowering, but the less toxic ferrous arseniate may be used even afterwards. The remedies for mildew and for Cochylis were tried together, to allow of more frequent treatments as well as to give the chance of operating at the moment when the Cochylis hatches. M. Desflassieux arrived at this result with sulphate of iron: a cupric mixture was prepared with an excess of iron sulphate, and also a ferro-arsenical mixture with an excess of iron sulphate, so that the one could not react on the other. The following method should be adopted:

- 1) make the cupric mixture in 50 litres of water instead of in 100;
- 2) make the ferro-arsenical mixture in 50 litres also, and when the precipitates are well formed mix the two together, so as to have 100 litres of anticryptogamic and insecticide mixture.

More than 50 000 vines were treated in this way in 1910, with the most satisfactory results.

E. MANCEAU. **Salts of Silver as a Prevention of Mildew.** (Les sels d'argent contre le mildiou). — *Progrès agricole et viticole*, No 48, Montpellier, 27 Novembre, 1910.

M. Manceau records experiments made by M. Goyard, a vine cultivator of Champagne, for the purpose of comparing the results of treatment with copper salts with those obtained by the use of nitrate of silver.

The experiment were carried out:

- 1) on young plants in nurseries.
- 2) On adult vines with leaves and grapes.

After four applications made the same day, the leaves in the nurseries treated with nitrate of silver showed larger patches of mildew than those treated with Bordeaux mixture. The result was the same in the case of an adult vine without grapes, while on another which still had some fruit, the grapes sprayed with silver salts solution were clearly much better preserved than those treated with a solution of copper salts.

Thus for *grapes* the silver salts appear efficacious.

France

A. V. JACZEWSKI. **Treatment of Seeds with Formalin.** (Ueber die Beizung der Samen unserer Kulturgewächse mit Formalin) (1). — *Praktische Blätter für Pflanzenbau und Pflanzenschutz*, Nov. 1910, pp. 130-132. Stuttgart, Nov. 1910.

Good results in hindering the diffusion of *Tilletia* (smut) have been obtained by treating the seeds of various cereals with formalin solutions.

The following rules should be observed:

- 1) Only grain harvested the same year should be treated, as long storing renders it too susceptible to the action of formalin.
- 2) An aqueous solution of 0.15 % is the best, made by adding to one litre of formalin (40 %) 300 litres of water.

Germany

(1) The use of the commercial solution of formaldehyde (formol), as a preservative against the attack of fungi, has been recently recommended by many writers, especially Americans; Bolley and Swingle, Geuther, Arthur etc. (G. GUÉNAUX, *Entomologie et Parasitologie agricoles*, Paris, 1904). [Ed.].

Parasitic Diseases of various Plants and Means of Prevention and Cure (1).

F. M. Straw-Blight of Cereals. (Le Piétin des cereales). — *Revue Scientifique*. Paris, 5 Novembre, 1910, p. 596.

This disease, common to wheat, consists of an alteration in the lower internode of the stem caused by a fungus *Ophiobolus graminis*. Prillieux described the disease; but till lately, little was known of the parasite, still less of methods for arresting its development and ravages.

France

The only remedy was to allow long intervals to elapse before re-sowing the ground with wheat, so that in the mean time, the spores of *Ophiobolus* perish for want of food.

M. Fron, lecturer on vegetable biology at the Agricultural Institute, has shown that the spores of this fungus are killed by a few days' exposure to light, while the direct rays of the sun destroy their vitality in three or four hours. The application of ferric or cupric solutions is equally effectual, and upon this fact, future treatment will probably be based. Although the use of these solutions has hitherto retarded, but not arrested the disease, its prevention is only a question of further study and adjustment; hence the value of the experiments made by M. Fron.

GRIFFON and MAUBLANC. New Investigations on Beet and Mangel Rot. (*Bulletin de la Société mycologique de France*, vol. XXVI, 1910, pp. 126-131, 1 fig., tab. 1); *Annales mycologici*, vol. VIII, No 5, Berlin, Oct. 1910, p. 577.

France

By using pure cultures, the writers have been able to show that beet rot (2) and spot-disease of the leaves, which frequently occur together, are produced by two different fungi which have nothing in common. The first disease is caused by *Phoma tabifica* and the second by a *Cladosporium*.

Potatoes: A Variety not affected by Phytophthora. — (See page 248 of this *Bulletin*).

(1) The Plants are arranged in the same order as in the first part of this *Bulletin*.

(2) Pourriture du cœur de la Betterave (Fr.) Rübenherzfäule (Ger.) Beet and Mangel Rot (Eng.). [Ed.].

L. FAUCHERON. **Wart Disease of the Potato.** — *Revue Agricole, Viticole et Horticole*, 1910, No 94, Lyons, pp. 240-242, 8th year, Oct. 25, 1910.

M. Faucheron, botanist at the Botanical Garden of the *Parc de la Tête d'Or* at Lyons gives the following information:

« A new and serious disease known as *black mange*, *wart disease* etc. has affected potato crops for some years past. The disease produces an abnormal growth or wart-like excrescence of varying size, in the eyes of the tuber, and often the whole potato is covered with a blackish, wart-like crust.

France

« Schilberszky, in 1896, called the parasite *Chrysophlyctis endobiotica*, a fungus of the *Chytridiaceae* family. The diseased tubers had been sent to him from Upper Hungary. Since that period, the disease seems to have spread in Europe, especially in the North; it has even crossed the Atlantic, and was last year reported from Canada. In many places it has assumed a serious character.

« The remedy is alternation of crops, and the planting of perfectly sound seed potatoes.

« If given to cattle, the diseased tubers should be boiled, as it has been shown that the spores of the fungus are capable of germinating after passing through the digestive organs ».

The Nilgiri Potato Disease. — *The Indian Agriculturist*, Vol. XXXV, N. 10. Calcutta, Oct. 1, 1910.

Mr. W. Mc Rae, Mycologist to the Government of Madras has been studying potato diseases in the Nilgiris, and has found that the commonest, namely, *Irish Blight*, *Early Blight* and *Bangle Blight*, are being spread by the carelessness and ignorance of the growers.

British
India:
Nilgiris

Mr. Mc Rae's report, which is accompanied by practical advice for controlling these diseases, has been published in the *District Gazette* by order of the Madras Government, and copies of the paper have been distributed gratuitously amongst potato growers. The *Curator of the Government Gardens and Parks* has been instructed to make experiments in the production of disease-resisting varieties.

L. MAUBLANC. **Diseases of Plants in Hot Countries.** — *L'Agriculture pratique des Pays chauds*. Oct. 1910, N. 91, pp. 312-320.

M. Maublanc continues his account of the diseases of the sugar cane, following the notes and work of the late Mr. G. Delacroix. The *Sereh* and some other little known diseases of the stem of the sugar cane are dealt with, as well as diseases of the roots, beginning with the rotting of the cane produced by *Phalloidea*.

France

To combat *Sereh*, he recommends a careful selection of the cuttings, which ought always to be taken from young stems of perfectly sound plants and, for greater security, from places where there is no sign of the disease. This is easy at Java, where the disease is unknown in the mountain regions. These regions are not very favourable to cane cultivation, but that would be no obstacle to the institution of special fields for the cultivation of sugar cane for slips.

Various experts, Krüger, Hein, etc., are very insistent on this point.

The choice of varieties is a point still to be studied.

Disinfection of Soil sown with Tobacco. (Tabaco-Desinfeccion de las tierras).

— *El Hacendado Mexicano*. Mexico, Nov. 1910.

Mexico

The *Departamento de Patología Vegetal de Cuba* (the Vegetable Pathological Department of Cuba) states that the use of commercial formalin in sowing tobacco, is to be recommended, excellent results having been obtained by experiment. Before sowing, the plots are moistened with a solution of 100 gr. to 20 litres of water. In this way, the seedlings are protected from the fungi which attack them so frequently, especially *Rhizoctonia*. The formalin solution is both a preventive and a cure. Mixtures of sulphate of copper and lime are not recommended,

P. DUSSERT. Note on Coffee Plants not affected by *Hemileia Vastatrix*, introduced into Réunion and Madagascar by the Jardin colonial. —

Agriculture pratique des Pays chauds. Oct. 1910. N. 91, pp. 337-338.

There are two ways of protecting the coffee plant against *Hemileia vastatrix*: direct action, and the use of resistant varieties. The direct action suggested by Dr. Delacroix's investigations consists of spraying the plants three times with a neutral mixture of copper sulphate as a preventive treatment. If the plants are then carefully pruned, the attacks of the *Hemileia vastatrix* become practically innocuous.

Madagascar.
Réunion

The most resistant species to this disease, is the *Coffea congesta* var. *Chalotii* Pierre, introduced into Madagascar in 1900 and noted as resistant in 1903 by M. E. Prudhomme, Director of Agriculture at Madagascar. It gives a good crop of very small, but well formed beans, and the coffee obtained is not disagreeable. These qualities, added to its capacity for growing in cool soils and at very low altitudes, render its cultivation advisable.

The writer also mentions the *C. canephora* var. *opaca*, which is similar to the last described, but will not grow near the sea; and the *C. javanica*, very like the *C. liberica* and making an excellent coffee.

It is nearly as resistant as the Congo coffee plant, and grows best at an altitude of from 200 to 500 metres.

W. M. A. MC RAE. **Report on the Outbreak of "Blister Blight," on Tea in the Darjeeling District in 1908-1909.** — (*Agric. Res. Inst. Pusa-Bull.* N. 18. Calcutta, 1910, pp. 19+6). *Rivista di Patologia vegetale*, Anno IV, N. 15, 1910. Pavia. pp. 232-233.

Blister Blight is a disease of the tea plant caused by *Exobasidium vexans* Mass. This fungus causes swellings and blisters on the leaves and buds and renders them useless.

The outbreak occurred in the Darjeeling district in 1908, and spread considerably during the following year. It does harm not only to the tea plant, but also to *Quercus*, *Rhododendron*, *Vaccinium*, *Machilus*, *Lourus*, etc.

The best means of controlling the disease is to thoroughly prune the plant, exposing the leaves as much as possible to light and air, to destroy all infected leaves, and to spray with Bordeaux Mixture.

British
India

F. GRÉQUEU. **On a Fumago or Smut of the Seeds of the Cacao Tree of San Thomé, caused by an Acrostalagmus.** — (*Bulletin trim. de la Soc. myc. de France*, 1910, t. XXVI, pp. 187-247, avec deux tables). *Rivista di Patologia vegetale*, Anno IV, N. 15, Pavia, Nov. 15, 1910, pp. 230-231.

The ripe fruit of the cacao tree in the island of St. Thomé is frequently infested by a mycelium, at first white and afterwards a blackish green, which invades the placenta and spreads over the teguments of the seeds, blackening them and rendering them useless from a commercial point of view. This disease has long been known, but of late years has assumed alarming proportions and is causing serious damage.

St. Thomé

Microscopical study and culture of the fungus, have shown it to be an *Acrostalagmus*, analogous to *A. Vilmorinii*, which M. Gréqueu has already observed and described as a parasite on certain *Asters* in France. It has this difference, that it does not form sclerotia and is provided with higher conidiophores and non-ocellated conidia.

It has therefore been classed as a new form: the *Acrostalagmus Vilmorinii* f. *Thomensis*.

The rind of much of the fruit attacked had been pierced in one or more places by the *Xyleborus perforans*, a small beetle common in sugar plantations, which penetrates the seeds of the cacao and feeds on the rootlet of the embryo. It is mainly through holes produced by this insect that the Black Disease attacks the fruit, or through the conducting tissue of the style, in rare cases, where the fruit has not been bored.

The fruit should be treated with a preventive insecticide and fungicide mixture, and in the warehouses, the sound fruit should at once be separated from those attacked by the disease which is reproduced by contact.

- B. BOIS and C. GERBER. **Some Parasitic Disease of the Cinnamon Tree of Ceylon.** — (*Ann. Jard. bot. Buitenzorg*, 3^e Supplément (*Treub-Festschrift*) I, pp. 109-116, 1909). *Botanisches Centralblatt*, Band 114, N. 18, Jena, Nov. 1, 1910, p. 467.

Ceylon.
Java

Messrs Bois and Gerber, who have already published a preliminary note on the subject (*Bull. Soc. bot. Fr.*, LI, 1904) now give a detailed description of a disease of the cinnamon tree, due to a new Acarian of the *Eriophyidae* group: the *Eriophyes Boisi* Gerb. (*E. Doctersi* Nalépa).

This kind of cancer does not seem to affect the value of the bark in Ceylon, but in Java the young plants appear to suffer greatly from it.

- G. F. STONE. **Calico or Mosaic Disease of Cucumber and Melon.** — *Twenty Second Annual Report of the Massachusetts Agricultural Station*, p. 163. Boston, 1910.

United
States:
Massa-
chusetts

A disease appeared amongst cucumbers, tomatoes and melons some time ago in Massachusetts, which presents all the symptoms of the so-called "calico" or "mosaic" disease of tobacco. The most noticeable and common symptom of the disease is a mottled or spotted appearance of the leaves.

Nothing is known of the cause of the disease, and no pathogenic germs have so far been discovered.

- GEORGE H. CHAPMAN. **Notes on the Occurrence of Fungus Spores on Onion Seeds.** — *Twenty Second Annual Report of the Massachusetts Agricultural Station*, pp. 164-167. Boston, 1910.

United
States:
Massa-
chusetts

The Agricultural Experiment Station at Massachusetts has recently detected numerous fungus spores on onion seeds, which, it has been found, carry many common cryptogamic diseases from place to place, as soon as the onions are put on the market. The following species, to which the black rust disease and moulds, are due, are the most injurious: *Urocystis cepulae* Frost, *Macrosporium Porri* Ellis and *Peronospora Schleidenina* De Bary. By carefully disinfecting the onion seeds, a very large proportion of these cryptogams can be prevented from developing.

- E. MARCHAL. **Gooseberry Mildew (*Sphaerotheca Mors-uvae* Schw.) in Belgium.** (Das Auftreten des amerikanischen Stachelbeermehltaues in Belgien). — (*Zeitschr. Pflanzenkrankh.* XX, pp. 234-235, 1910). *Botanisches Centralblatt*, Bd. 114, N. 20, Jena, Nov. 15, 1910, p. 518.

Belgium

The *Sphaerotheca Mors-uvae* (Schw.) B. and C., made its first appearance in Belgium in 1909, a plantation of gooseberry bushes (var. *Whinham's Industry*) covering 4 $\frac{1}{2}$ hectares, being very seriously attacked.

The disease was overcome by treatment with potassium sulphide.

- B. NAMYSLOWSKI. **Two Forms of Epidemic Mildew.** (Neue Mitteilungen über das Auftreten von Zwei epidemischen Mehltaukrankheiten). — (*Zeitschr. Pflanzenkrankh.* XX, pp. 236-238, 1910). *Botanisches Centralblatt*, Bd. 114, N. 20. Jena, Nov. 15, 1910. p. 518.

The *Sphaerotheca Mors-uvae* (Schw.) B. and C., was first discovered on gooseberry bushes in Galicia in 1909.

Austria:
Galicia

In various districts of the same country, an *Oidium* was observed on oak trees, differing from the *O. quercinum* Thüm. in the greater size of its conidia.

- P. MAGNUS. **A New Fungus in the Transvaal producing Cancerous Growths.** (Ein neuer Krebsartige Auswüchse auf der Wirtspflanze veranlassender Pilz aus Transvaal). — (*Berichte der deutschen botanischen Gesellschaft*, 1910, Bd. XXVIII, pp. 377-380); *Rivista di Patologia vegetale*, Anno IV, N. 154, Nov. 15, 1910. Pavia, p. 232.

South
African
Union:
Transvaal

M. Magnus describes a Mucedinea, *Hyalodema Evansii*, belonging to a new genus and a new species, which causes characteristic cancerous growths on the stems and small leaves on the *Zizyphus* (1).

- F. HEIM. **Damage caused in Roseries by Botrytis Cinerea Pers.** - (*Notes de Botanique*, Paris, June 1908); *Botanisches Centralblatt*, Band 114, N. 18. Jena, Nov. 1910, pp. 467-468.

Both in the open air and in greenhouses, *Botrytis cinerea* Pers. frequently invades the petals and sometimes even the stalks of roses.

France

Buds which are attacked at an early stage, rot away without opening. The best method of controlling the pest is to remove the flower or leaves attacked which, together with the petals that have fallen, should be destroyed; the use of fungicides is less satisfactory.

- FOEX. **Disease of the Violet Plant.** *Annales de l'Ecole Nationale d'Agriculture de Montpellier*. Montpellier, Oct. 1910.

This disease is causing considerable damage in the violet beds of Toulouse; the plants droop, and the leaves, which frequently remain small, turn yellow and curl up. The flowers are scarce, and as new roots are rapidly formed as soon as the old ones are destroyed by the fungus, the plant soon

France

(1) Amongst other species belonging to the genus *Zizyphus* (*Rhamnaceae*) there is one which produces edible fruit (*Z. sativa* Gaertn.). [Ed.].

becomes exhausted. The same fungus is found in all the diseased parts, and would therefore seem to be the cause of the disease: it is generally localised in the cortical tissues. The fungus, first described by Zopf, is called *Thielavia basicola*. The damper and more compact the soil, the more rapidly the fungus develops. It seems impossible to cure the plants when once attacked.

As the flowers are commercially worthless, it is best to pull up the plants and burn them, and before sowing, the soil should be sterilised with *formol*. The same advice may be given for violet growing as Lyman J. Briggs gives to tobacco growers who have to fight the same disease:

- 1) Never use lime dressings;
- 2) Apply potash in the form of sulphate of potash;
- 3) Use acid phosphates.

H. CRÉPIN. **Chrysanthemum rot.** Contribution à l'étude des moyens propres à prévenir ou à guérir la pourriture des fleurs de chrysanthèmes). — *Société centrale d'Agric., d'Hort. et d'Acclimatation de Nice et des Alpes-Maritimes*. Nice, Oct. 1910, N. 10, pp. 334-341.

France

After giving several rules for the cultivation of chrysanthemums, M. Crépin states that experiments have shown these plants to require lime especially, potash standing next and then phosphoric acid and nitrogen. The chrysanthemum has very little need of the last substance, notwithstanding the generally accepted belief to the contrary, an excess of this manure usually resulting in bud-rot. The rotting of the petals can also in some cases be attributed to the same cause. The plant is very easily invaded by parasites under the action of excessive nitrogenous fertilisers. Petal rot is due to *Botrytis cinerea*. The writer gives a number of methods chiefly for protecting the flowers from humidity in greenhouses. Care should be taken to keep the air about the plants rather dry. Bud-rot may be prevented by spraying with oxidising liquids (for instance, 2 gr. of nitric acid in a litre of water).

L. A. HAWKINS. **Experiments with Cupro-Calcic Sprayings against Black Rot in the Michigan Vineyards.** — *Bureau of Plant Industry. U. S. Dep. of Agric. Circ.* N. 65, pp. 1-5.

United
States:
Michigan

These experiments, made in 1909, have shown that black-rot, caused by the fungus *Guignardia Bidivellii* (Ell.) V. & R., may be controlled, even in years that are favourable to its development, if treated with Bordeaux Mixture. The disease was very prevalent during the year 1909, but spraying reduced the damage done in the vineyards by 84 per cent.

CHAS. P. LOUNSBURY. **Apple Bitter Rot.** — *The Agricultural Journal of the Cape of Good Hope*, vol. XXXVII, N. 4, pp. 355-364. Cape Town, Oct. 1910.

Glomerella rufomaculans var. *Cyclaminis*, the fungus that causes apple bitter-rot, is stated to have appeared in South Africa for the first time, in the districts of George and Humansdorp. The use of Bordeaux Mixture is advised for its control.

South
African
Union:
Cape
Colony

E. GRIFFON and M. MAUBLANC. **Species of *Sphaeropsis* (1) and *Diplodia* (2). Parasites of Pear and Apple Trees.** — (*Bull. trim. de la Soc. Mycologique de France*, 1910, T. XXVI, pp. 307-316; avec 2 tables et 2 gravures). *Rivista di Patologia Vegetale*, Anno IV, N. 15. Pavia, Nov. 15, 1910, pp. 220-221.

Several pear trees at the Agricultural School at Grignon have been attacked by a disease of the branches, which shows itself in round or irregularly shaped wounds, flattened, and clearly defined by a prominent line. These wounds generally appear round the buds, or at the base of a small branch, and at times they spread out irregularly. The bark gradually becomes covered with cracks and finally falls off.

France

Then appear the pycnidia of a fungus which the writers consider to be the cause of the disease, first as *Macrophoma* (3) and then as *Diplodia*. The study of the latter led to the comparison of all the fungi of this group with one another. They have already been found on the pear and apple tree, and are sometimes considered as belonging to the same and sometimes to different species.

The writers have concluded that the pear and apple are liable to be attacked by the *Sphaeropsis* as well as the *Diplodia*, that these two species, although very similar, are quite distinct; that they are often saprophytes, but that they may become a kind of parasite by developing on wounds, when they cause identical lesions.

These various fungi are:

- 1) *Sphaeropsis malorum* Peck, producing elongated unicellular spores, with a finely granulated surface.
- 2) *Sphaeropsis pseudo-Diplodia* (Fuck) Delac. producing unicellular, spores, with granulated surface, but larger and wider than the preceding.
- 3) A *Diplodia* which has not been determined, producing unicellular spores with smooth surface.

This last is the cause of the disease observed at Grignon.

(1) (2) (3) *Sphaeroidiaceae*.

Diseases of Cocoa Nut Palms. — (*The Agricultural News*). *The Journal of the Jamaica Agricultural Society*, vol. XIV, N. 10, Oct. 1910, p. 362.

The chief diseases of the cocoa nut palm are bud rot, root disease and stem bleeding disease.

Bud rot, found in the West Indies, India, Ceylon and the Philippines, is apparently due to the action of bacteria. In Trinidad the disease shows itself by the yellow and drooping leaves and the putrid state of the whole terminal bud; the immature nuts fall off, and the terminal leaves turn brown. The best treatment in the early stages seems to be flaming or the use of Bordeaux Mixture, but when the disease is far advanced, the only remedy is to destroy promptly all the plants that are seriously attacked.

The Department of Agriculture at Trinidad has granted 500 dollars for the destruction of these trees, which must be done under the supervision of an agricultural inspector.

The root disease is known at both Trinidad and Ceylon, but the pathogenic organism does not seem to be the same. The Trinidad disease (also found at Travancore, in India) is believed to be due to a fungus, *Botryodiplodia*, the mycelium of which is usually found in the diseased roots. Johnson, however, is of opinion that the disease is of bacterial origin, probably of the same nature as the bud rot. As to the Ceylon root disease, Petch almost conclusively proves that it is due to a fungus, *Fomes lucidus*, which develops in the outer ring of vascular bundles in the lower trunk of the tree, embracing the whole of the tree from the ground to the height of three feet.

The sap-conducting cells are filled with hyphae, the food supply of the tree being thus cut off. The only remedy is to fell the tree, burn the trunk to a height of three feet and then dig a trench 60 cm. deep around the roots, and leave it open for at least a year.

The symptoms of stem bleeding vary with the age and the kind of tree, but generally speaking, the bark cracks and a brown viscous liquid oozes out, turning black and leaving a dark stain around the crack. The tissue near the crack is found to be soft and watery, and sometimes it falls away, leaving a hole filled with fibre that is frequently cleaned out by termites; in certain cases the whole tree is hollowed out from the base to within a few feet of the terminal bud.

The disease does not appear to have much effect on the crops, nor on the trees; but it renders them fragile and liable to be broken by high winds. The fungus which causes the disease, *Thielaviopsis ethacetica*, also attacks pine-apples and sugar canes. As a remedy, diseased parts should be cut away and burnt, the cut surfaces burnt with a torch and tar applied.

West Indies.
British
India.
Philippines.
Trinidad

E. J. BUTLER: **Bud Rot of Palms in India.** — *Memoirs of the Dept. of Agric. in India, Botanical Series*, vol. III, N. V, pp. 221-278. Calcutta, Sept. 1910.

In this paper Mr. Butler gives a detailed account of his lengthy investigations on bud-rot, very prevalent among palm trees in India.

This disease is due to an Oomycete, the *Pythium palmivorum*: it generally attacks the sheaths of the undeveloped leaves which cluster around the top of the plant. The disease is propagated directly by fragments of mycelium or by zoospores. The hyphae penetrate through the stomata into the parenchymatous tissues, where they ramify in the intercellular spaces and send a large number of suckers inside the cells. They continue to ramify in the substance of the sheath, and gradually penetrate into the leaf that lies within; when there is sufficient space, they form instead a felt of compact mycelium.

The sporangia and conidia are differentiated in this species of hyphenchyme tissue, either at the extremity or on the lateral branches of the sporangiophore or conidiophore hyphae.

Nothing new is said as to the form of the sporangia and their mode of germination, but the "resting conidia," or conidia in a state of latent life, are mentioned for the first time. These are true conidia, which, after periods of extreme drought, pass from the state of latent to active life when the rains return, and propagate the species.

In previous experiments, Mr. Butler believed he had discovered oospores in these structures, but this is not the case, they are wanting or extremely rare, and are of no practical importance for reproduction of the fungus.

Two main factors regulate the geographical distribution of this disease, the meteorologic and biologic; by the latter is meant the greater or less degree of resistance of particular individuals. This characteristic is in intimate relation with the nature of the soils; all along the rivers and in localities that are inundated periodically, the damage caused by bud-rot is much greater than in dry and sandy soils. Damp favours the development of the disease, but the effect of rain is not so clear, because if the mortality is very great during the monsoon (the period of abundant rains), it is also considerable in the cold months when there is little rain, but a good deal of mist and dew.

The disease has spread from the first centre of infection, Gautami Godawari, in a regular, circular area at the average rate of about a mile a year. It may be propagated by the wind, by insects or by man. The two former, however, are rather limited in their action, because the very position of the reproductive organs in the depth of the sheath makes them difficult of access by the wind, and the action of insects is limited; so that the

**British
India**

burden of responsibility falls upon the *climber*, who, as his name indicates, climbs to the top of the palm tree to tap the buds, which contain a sweetish fermentable liquid that is used in India as a drink. During the tapping, many spores become attached to the knife and are easily passed on to other plants, just in the parts where the fungus is most likely to develop.

Bordeaux Mixture is advised as a preventive measure, but palms already attacked, must be felled and burned.

OAK. **Blister Blight Oidim.** — See pages 363 and 365 of this *Bulletin*.

GRIFFON and MAUBLANC. **Oak White and *Oidium Quercinum* Thümen.** (*Bull. Soc. myc. de France*, vol. XXVI, 1910, pp. 132-137, 1 fig). — *Annales mycologici*, vol. VIII, No. 5, Berlin, Oct. 1910, p. 577.

France: Investigations made on the disease called *Oak White* have established the fact that the *Oidium*, which appeared in 1907 in epidemic form on oaks over the greater part of Europe, has not been identified with *Oidium quercinum* Thümen nor with the conidial generations of *Microsphaera Alni*, which have also been observed on the oak. On the other hand it has been shown that *Oidium quercinum* is a conidial generation of *M. Alni*.

Whilst awaiting the discovery of the ascophore form, which alone can definitely decide the question, it has been proposed to give the provisional name of *Oidium alphitoides* to the fungus of the Oak White Disease.

GUEGUEN. **The Occasional Parasitism of *Volvaria Murinella* Quélet.** (*Bull. Soc. mycol. de France*, XXV, pp. 243-244, 1909). — *Botanisches Centralblatt*, Band 114, No. 18, Jena, Nov. 1, 1910, p. 467.

France: **Finistère** *Volvaria murinella* Quélet, observed by G. Bernard among mosses, and by Patouillard on lawns, has been found by Guéguen with three receptacles on a pine cone (species not given) in Finistère. The cone was attached to the tree and the upper scales were still green. The fungus started from the middle part of the strobilus.

EULEFELD. **Withering of Plantations of *Picea Excelsa* Caused by *Rhizina Undulata*.** (Absterben in Fichtenkultur, veranlasst durch *Rhizina undulata*). — *Naturwissenschaftliche Zeitschrift für Forst- und Landwirtschaft*, VIII, Jahrgang, Heft 11, Stuttgart, November 1910, pp. 527-529.

Germany: **Hesse** Near Lauterbach, Upper Hesse, last summer at an altitude of 325 m. and on a basaltic soil sloping south, all the spruces (*Picea excelsa*, Link), and all the spontaneous vegetation within a circular band 60 cm. wide on a 12 metre diameter, died completely.

The very soil seemed burnt, while the surrounding soil, on the contrary, was covered with flourishing plants.

The trees were planted 5 years ago on stony grazing land.

It has been found that the cause of this decay is an Ascomycete, *Rhizina undulata* Fr. (The disease is called *Wurzelschwamm*, *Ringseuche*, *Maladie du rond*, *Ring Disease* of the pine tree). This fungus is found over a very extended area; it has already shown itself in Germany in plantations of *Pinus sylvestris* L. and other conifers. It spreads under the surface of the soil in a circular line, by means of the mycelium, which passes from one root to another.

A. P. **Trees Damaged by Snow in Young Woods and the *Herpotrichia Niger*.** (Schneescha-den an Jungwüchsen durch Entästung). — *Schweizerische Zeitschrift für Forstwesen*, 61 J., No. 11, pp. 321-325, Bern, Nov. 10, 1910.

The writer deals with the damage caused to young conifers in Switzerland by the snow, which accumulates until it reaches the branches, then thawing, the surface sinks and drags them down. Young trees grown on the spot offer most resistance to the snow, especially where the reforestation is intensive and they are sheltered from the winds. The greatest damage is done in the gorges, where the snow accumulates in masses, and where *Herpotrichia nigra* (1) renders restocking very difficult by preventing the germination of the seeds.

Switzerland

Some Diseases of Rubber Trees. — *The Agricultural News*, Oct. 15, 1910; Barbados, West Indies; (from the *Bulletin of the Straits and Federated Malay States*, Vol. IX, p. 216).

A species of *Eutypa* not yet described, and called *Eutypa caulivora*, has been found on dead plants of *Hevea*. It is probably a true parasite, analogous to other species of *Eutypa*. This fungus remains in the vegetative and therefore injurious state, as long as the plant lives, and only comes to the surface to fructify, when the plant is dead. The longitudinal, deep black wounds on the trunks attacked, are caused by the mycelium of the fungus, which in all probability, invades first by slow and prolonged action the whole woody mass. The development of this mycelium has never been found on dead plants. A similar disease is caused at times in the West Indies, on the cacao, the *Ficus*, etc., by *Eutypa erumpens* Massee.

Antilles:
Barbados

(1) *Herpotrichia nigra* (*Sphaeriaceae*) is an epiphyte fungus, a parasite of Conifers, which adheres to them by the aid of small projecting organs from which issue black mycelious filaments resembling those of the *Fumagos*, which enter the epidermis like a wedge.

A new disease, not yet well defined, and similar to that caused by the *Corticium Zimmermannii* (C. *javanicum*), has been found on plants of *Hevea*. The first symptom of the disease is the appearance of coagulated latex at the infected spots, the surface of the branches attacked turns black and is covered with cracks, and spots of latex mark the places where the infection began. The branches affected decay rapidly. Diseased branches should be broken off, and those that are still healthy sprayed with cupro-calcic mixtures.

A species that comes from the tea plantations and resembles the *Marasmius*, attacks the *Hevea* in Ceylon, and a new species of *Nectria* has been discovered, *Nectria Funtumiae* Massee, which is similar to the fungus that causes the gangrene of the Ceylon *Hevea*. The fruit of this tree has also been attacked by a species of *Phytophthora*, resembling the *Phytophthora* of the cacao fruit. *Nectria diversispora*, *Sphacronema album* Petch, and *Diplodia zebrina* Petch then develop as saprophytic fungi on the fruit attacked. The *Pestalozzia Guepini* Desm. attacks the seeds of the *Hevea*, and a species of *Cercospora* attacks the seeds and leaves of the young plants in the nurseries.

Among fungi which infest the leaves without as a rule causing serious damage, the following may be mentioned: *Helminthosporium Heveae* Petch, *Collectotrichum Heveae* Petch, *Gloeosporium brunneum* Petch, of Ceylon; *Phyllosticta Heveae* Zimm. and *Gloeosporium elasticum* Cke. and Mass., of Ceylon and Java; *Phyllachora Huberi* P. Henn., *Dothidella Ulei* P. Henn., *Aposphaeria Ulei* P. Henn., *Ophiobolus Heveae* P. Henn., *Parodiella Melioloides* (Berk. and C.) Wint.; of the Amazon rivers.

Bernard speaks of *Pestalozzia palmarum* in the Dutch Indies. *Collectotrichum ficus* and *C. elasticae* are found on the leaves of the *Ficus elastica* in Java. Very few of these diseases have been found in the West Indies, although the cultivation of cacao is very extensive. The diseases of the cacao plant have attacked the *Hevea* in Ceylon and elsewhere.

Insects and other injurious Invertebrata: Biology. — Control.

G. DEL GUERCIO. **Preliminary Study of Elaterides and Cebrionides.** (Prima contribuzione alla conoscenza degli Elateridi e dei Cebrionidi. Note ed osservazioni). — “*Redia*” *Giornale di Entomologia*, pubblicato dalla R. Stazione di Entomologia agraria in Firenze, vol VI, fasc. 2°, 1910, pp. 235-241.

Italy

The writer first confirms the results of Mr. Curtis' observations, according to which, the larvae of Elaterides (*Agriotes lineatus*, *A. obscurus* L.) and

Cebionides (*Cebrio gigas* Fabr. *C. dubius* Rossi) do not feed on the roots of plants, as is generally believed, but attack especially the base of the haulms of cereals and herbaceous plants, cultivated or growing wild. He further points out that the larvae attack the plant slightly above the crown, where their mandibles hollow out a cavity, frequently penetrating right into the haulms and mounting towards the upper nodes; this process he observed particularly in tomatoes and potatoes.

M. Del Guercio has shown by many experiments, that the larvae of the above-mentioned coleoptera, failing plants or parts of fresh plants, live, for some time at least, on organic debris. This proves, that the practice of destroying weeds and living roots after harvest, does not force the larvae living under ground to die of starvation, as is generally believed.

The writer has also shown by experiment the extreme resistance of the larvae to damp and immersion in water. This resistance may last for from 20 to 30 days during the good season, and it is probable that it lasts even longer in severe weather, when the respiratory activity of the insects is much reduced.

Damp therefore, does not, any more than flooding the soil in which they live, injure the larvae of Elateridae in any way, or preserve sown fields from their action.

Experiments were also made to determine the resistance of the larvae when exposed to the open air under various conditions. The open air is injurious to the larvae as a rule, frequently killing them after a short time.

As a preventive measure against *Agriotes*, the soil should be tilled from the end of March to the middle of April or a little later, that is, up to the period when the larvae form a little capsule of earth in which to undergo their metamorphosis. These nymphal cells may be collected and destroyed as they are turned up by the plough. In fine weather, however, there is no need to do so, for the larvae will die, in any case.

H. S. FAWCETT. **An important Entomogenous Fungus.** (*Mycologia*, vol. II, 1910, pp. 164-168; Tab. XXVIII-XXIX); *Annales mycologici*, vol. VIII, No. 5. Berlin, Oct. 1910, p. 573.

H. J. Webber found, in 1896, on the larvae of *Aleyrodes Citri* and *A. rubifera*, homoptera which live on the leaves of *Citrus*, a fungus which appears to be a very important natural enemy of these insects. It has hitherto been known under the popular name of Crown Mealywing Fungus, but has now been described by the writer as a new species under the name of *Aegerita Webberi*.

Mr. Fawcett has succeeded in artificially infecting the larvae of *Aleyrodes* with this fungus.

Great
Britain.
Germany

J. A. HYSLOP. **The Smoky Crane Fly.** — *U. S. Dept. of Agr. Bur. of Entomology*, No. 85, Part. VII, p. 150. Washington, Oct. 7, 1910.

United
States

Serious damage may be caused in fields of clover and forage grasses by the larvae of the *Tipulidae*, which devour the young plants; and Mr. Webster's proposal to use certain entomophagous fungi (*Empusa* sp.) against *Pachyrhina ferruginea* Fab. is therefore of considerable interest. The larvae and nymphae infected by this fungus, blacken and die in a very short time. On October 29th, a female of *Tipula infuscata* was found in one of the breeding cases, dead and covered with an abundant fungoid growth (*Sporotrichum densum*).

F. SILVESTRI. **Contribution to the Study of Noxious Insects and their Parasites.** I. *Galerucella* of the Elm. (*Galerucella luteola* F. Muell.) — (Contribuzione alla conoscenza degli insetti dannosi e dei loro sim-bionti). — *Boll. del Labor. di Zool. Generale e Agraria della R. Scuola Superiore di Portici*, vol. IV, pp. 246-289. Portici, 1910.

Italy

Galerucella luteola F. Muell. is a beetle very injurious to *Ulmus campestris* and other species of the same genus. It devours nearly all the leaves of the tree, both as a larva and a perfect insect, and thus destroys a good summer food for cows. If the insects increase to any considerable extent, they may cause the loss of all the leaves grown on the elm during the year, and also reduce the number of buds for the following year; and should they continue to multiply for several seasons in succession, in consequence of specially favouring circumstances, the result would probably be the complete ruin and loss of the trees.

A check to the development of this insect is furnished by climate, torrential rains, lack of nourishment, and especially the attacks of some insects which injure *Galerucella*, among which are: *Erynnia nitida* R. D., *Tetrastichus Nanthomelaenae* Rond., *Lebia scapularis* Faurer., *Coccinella Lyncea* Olib., *Anisolabis moesta* Serv. and *Zicrona coerulesa* L.

The idea of breeding and spreading these parasites as a natural check for the *Galerucella*, however, does not seem very practical.

The best way appears to be to collect the adult insects of the *Galerucella* in their winter retreats, and to water the elms with arsenical compounds (Paris green, in the proportion of 100 gr. per hectolitre of water against adult insects, and 70 gr. against the young larvae), and to destroy the chrysalides collected at the foot of the trees in the second half of June and in August.

F. SILVESTRI. **Metamorphosis of *Cybocephalus Rufifrons* Reitter, and Information concerning its Habits.** (Metamorfosi del *Cybocephalus rufifrons* Reitter e notizie sui suoi costumi). — *Boll. del Labor. di Zoologia generale e agraria della R. Scuola Superiore d'Agricoltura in Portici*, vol. IV, pp. 221-227, 1910.

Italy

The study of the metamorphosis and habits of *Cybocephalus rufifrons* Reitter, has shown that the adult insect lives on the branches and in cracks in the bark of mulberry trees infected with *Diaspis pentagona* Targ., which is frequently a victim to the larvae of *C. rufifrons*.

F. SILVESTRI. **Introduction into Italy of an Indian Hymenoptera to destroy the Orange fly.** (Introduzione in Italia di un Imenottero indiano per combattere la mosca delle arance). — *Boll. del Labor. di Zool. generale e agraria della R. Scuola Super. d'Agric. in Portici*, vol. IV, pp. 228-244, 1910.

Syntomosphyrum indicum Silvestri, is a parasite of *Ceratitis capitata* Wied. a fly which, in the larval stage, does much damage to a number of trees with sweet fruits (orange, peach, pear, fig, prickly pear etc.). It was brought from India to Italy in 1909, for the purpose of destroying the *Ceratitis*. A large number were bred, and about 10 000 were distributed at Rosarno, Calabria, a locality which has suffered greatly from the fly. The results are now being awaited.

Italy

There was some idea also of using this insect in Italy against the olive fly (*Dacus oleae*), of some species of which it is a parasite in India; but this is not likely to succeed, for the larva of the olive fly does not remain long exposed.

A. BERLESE. ***Diaspis Pentagona* Targ. and its Enemies.** (La *Diaspis pentagona* Targ. e gli insetti suoi nemici). — "Redia" *Giornale di Entomologia* pubblicato dalla R. Stazione di Entomologia agraria di Firenze, vol. VI, fasc. II. Firenze 1910, pp. 298-345.

In the first part of this paper, the writer deals at length with the biology of *Diaspis pentagona* Targ. giving detailed information on the morphology of this coccinella, its discovery, diffusion in Italy, geographic distribution and the numerous plants that it attacks. The second part enumerates the enemies of *Diaspis*, among which the following are worthy of note:

Italy

1) the weather, which has an active influence on the period when the larvae are hatched;

2) periodic pruning, by which the future larvae are deprived of nourishment;

3) insects which are occasionally endophagous, especially the hymenoptera; but as they are omnivorous, they are not of very great importance in the destruction of the white mulberry coccinella;

4) marauding insects (mostly of the coccinella family), whose action is as yet, however, uncertain;

5) the special endophagous insect, *Prospaltella Berlesei* How., a very small insect, and the only one, according to the writer, that is of any use against the *Diaspis pentagona*.

After giving the biology of the *Prospaltella* and the history of its discovery, M. Berlese gives details on its artificial diffusion by the Royal Station of Agricultural Entomology at Florence, by means of centres established for the purpose in various districts.

The memoir is illustrated by prints and by a fine coloured plate.

Influence of Tillage and Manure on Skip-jacks and Thrips. — (See page 228 of this *Bulletin*).

F. GROZDENOVIC. **The Invasion of Locusts in the Karst and Means of Controlling it.** (L'invasione delle cavallette sul Carso e modo di combatterla durante l'inverno. La lotta contro le cavallette sul Carso nell'estate 1909). — (*Ist. Sper. Chim. Agr. di Gorizia*, 1908, 8 p. and 7 fig. Col precedente, 1910, 18 p. 8 fig.); *Rivista di patologia vegetale*, Anno IV, N. 15, 1910, pp. 234-235. Pavia.

For some years, there have been extraordinary invasions of locusts in the Karst, especially in certain localities in the valley of Vipacco; they infest, not only meadows and grazing lands, but clover and potato fields, vegetable gardens, wheat and maize fields and even vineyards. Spraying with insecticides (tobacco juice) are effectual, but cannot be applied on a large scale. The common cupro-calcic mixture is a good protection for vines.

But direct destruction of the insect is more effectual, and by harrowing the ground in winter the eggs, which they lay in nests on the surface of the soil, can be killed.

In Gorizia, squads of school children hunt the young insects with special trailing nets; about 45 millions were destroyed in this way last year.

The locust has also natural enemies, such as the Coleoptera *Zonabris* sp., the Diptera *Anthrax* sp. and a fungus (*Empusa Grylli* or *Entomophthora Calopteni*).

Insecticides with Chromate of Lead. (Scientific Progress). — *The Chemist and Druggist*, N. 1606, Vol. LXXVII, N. 5, 1910, p. 46. London.

The Agricultural Experiment Station at Pusa has decided, after a series of experiments, to avoid the drawbacks attendant on the use of arsenical preparations, by substituting chromate of lead for arsenic in insecticides.

Austria:
Istria

British
India

A pound (0.453 kg) of chromate of lead diluted with 64 gallons (290 litres) of water forms an effectual mixture for plants attacked by insects, and an excellent preventive is made by diluting a pound of chromate with 100 gallons (454 litres) of water.

The chromate is easily seen on plants and does not injure the leaves.

SCHAFFNIT. Destruction of the Woolly Aphis by Cooper's Liquid. (Ueber die chemische Zusammensetzung von Cooper's Fluid und einige Versuche zur Bekämpfung der Blutlaus). — *Mitteilungen des Kaiser Wilhelm Instituts für Landwirtschaft in Bromberg*, Bd. III, Heft 1. Berlin, p. 48.

Investigations show that Cooper's Fluid is as good an insecticide as cresol soap but it is more expensive. Germany

Solutions of 1 to 3 per cent are completely useless against the woolly aphis (*Schizoneura lanigera* Hausm.), but it is killed by 10 per cent solutions of the soap and also by Cooper's Fluid, although neither is of any use, except for treating branches of mature trees during winter.

R. REGNIER. Slugs. — *Le Cantal Agricole*, Nov. 1, 1910.

Slugs live entirely on vegetables, and do much injury in field and garden. There are many ways of destroying them, but none really effectual for extensive cultivations.

In gardens, the vegetable plots should be surrounded with a border of quick lime, which, in powder, might be tried in the fields. France

The lime burns everything that it touches until it is completely carbonated by the air, when, if spread in sufficient quantities, it sticks to the slug, and encases it, killing it by asphyxia.

The best time to spread the lime is late in the evening.

P. NOËL. Destruction of Slugs and Snails. (Destruction des limaces et des limaçons). — *Bulletin de l'Association Agricole et Viticole de la Marne*. Reims, Nov. 1910, N. 11, pp. 196-199.

As a remedy against slugs, M. Noël has found efficacious: 1 kg. of wheat bran, and 100 gr. of arsenite of copper, added to a little water, and worked into a homogeneous paste. This is then divided into pieces, which are scattered over young wheat and other crops. France

Superphosphate, strewn at the time of sowing forms a good protection against snails, its acid property having a toxic effect upon them.

Snails on Mulberries. — *A General Report of Sericultural Investigations*, p. 40. *The Imperial Sericultural Institute*. Tokyo, 1910.

Snails (*Limax agrestis* L.) damage mulberry plantations in Japan, by eating the young buds.

Japan

Two methods are adopted for their destruction:

1) The ground is strewn with saw dust or chaff in which the snails hide during the day, thus it is easy to find them, and kill them with lime milk;

2) Lime or ashes are sprinkled round the trees at night-fall.

Insects noxious to special Crops.

Maize Plants attacked by Ear-Worm (*Laphygma fugiperda*). — *Report on the Botanical Station and Experimental Plots*. Montserrat, 1909-1910, pp. 18-19, Barbadoes, 1910.

In Montserrat, the caterpillars of *Laphygma fugiperda* caused much damage last season to maize crops. They attack the young plants soon after germination, and penetrate the interior of the stem of adult plants and destroy the leaves before they unfold.

Leeward
Isles:
Montserrat

Paris green, used with lime or water, and applied as dust or spray kills the caterpillars. Experiments with lead arsenate have not yielded definite results.

M. DE KONING. *Anthomyia funesta* Jul. Kühn, an Enemy of the Lupin. (De Lupinenvlieg). — *Tijdschrift der Nederlandsche Heidemaatschappij*, 22 Jaargang. Aflevering II, 1 p. 372-373. Utrecht, 1 November 1910.

Among enemies of the lupin, *Anthomyia funesta* (Jul. Kühn) is especially to be mentioned.

Netherlands

It deposits its eggs in the young tissues, at the critical period when the reserve products of the seed are exhausted, and before the young root system is able to absorb nitrogenous substances. The larvae, which hatch quickly, make long burrows in the interior of the stem and roots, which

they hollow out almost completely. The attack of *Anthomyia funesta* is much more virulent in high, than in low-lying districts.

So far, no remedy has been found; but much may be done by early sowing, which would allow the plants to pass the critical period of growth before the time of egg-laying.

WASSILIEW. Sugar Beets damaged by the Common Dart (*Agrotis*). (Die Beschädigungen der Zuckerrübe durch die Wintersaateule, *Agrotis*, und ihre Bekämpfung). — *Blätter für Zuckerrübenbau*, XVII Jahrgang, No. 20, pp. 330-332. Berlin, 31 October 1910.

Agrotis causes great damage to sugar-beets in the Government of Kiew (Russia). The larvae of these Lepidoptera first destroy the leaves, then sallying forth in the twilight or at night only, they devour the other parts of the plant.

Russia:
Kiew

They pass the chrysalis stage just below the surface of the ground, and this is the best time for their destruction by ploughing or digging them well in. The butterflies come out in summer, mate, and fly over the beet-root fields to deposit their eggs on the leaves.

It is then useful to distribute throughout the fields vessels containing molasses mixed with beer yeast which causes it to ferment. Attracted by the odour, the insects collect in large numbers, and remain adhering to the surface of the sticky liquid.

Frog Hoppers in Trinidad. — *The Agricultural News*, Vol. 9, N. 222, p. 346, Oct. 29, 1910. Barbados.

Much damage is being done to the sugar cane in Trinidad by insects known as Frog-hoppers (*Tomaspis*).

The following notes are from an article by Mr. F. W. Urich, Entomologist to the Board of Agriculture, in the *Bulletin of the Department of Agriculture*, vol. IX, p. 15, Trinidad, and from an interim report by the same writer.

Trinidad

These insects, like Coccideae and Aphidis, are *Cercopidae*, order *Hemiptera*, sub-order *Homoptera*. Three species are common in Trinidad, all of the genus *Tomaspis*; the most important is *T. postica*, and *T. bicincta* is also fairly common.

The frog hopper is found in Mexico, Nicaragua, Costa Rica, Demerara, and possibly also in British Honduras.

The canes attacked are stunted and the leaves become spotted and even wither. The lower leaves are the first to be attacked. The *Tomaspis* deposits its eggs in the dry canes and in the sheaths of grasses near the ground, where they hatch in 12 to 20 days in damp weather. In persistent

dry weather they may lie dormant as long as four months. The nymph period lasts between 32 and 41 days, and the pupa during this time, is covered with the froth from which it derives its name of "spittle insect," and by which it attaches itself to grasses, etc. The perfect insect is about 8 mm. long, and remains hidden until dusk, when it comes out in search of food.

Two methods are used to control this pest, the first being traps formed of hurricane lanterns placed on bricks in receptacles containing oil and water.

These are put at intervals of 50 feet among the canes, and as many as 252 559 insects have been taken by means of forty-eight of these traps in one night. The second method is to keep the soil absolutely clear of weeds, until the canes are sufficiently grown to prevent their development, and then to spray the ground and the canes with an insecticide, repeating the spraying after three weeks. The best time for this treatment is just after the crop has been gathered and before the rains begin.

The "Borer," of Indo China, a Parasite of the Coffee Plant. — (See page 263 of this Bulletin).

Insect Pests of Cacao in Jamaica. — *Agricultural News*, Oct. 15th, 1910. Barbados, West Indies.

Jamaica

The greatest enemies of the cacao in Jamaica are ants, which destroy its flowers (myrmicinae of the genera *Solenopsis*). Hitherto, no efficacious means of eradicating these pests, have been discovered, the tropical temperature preventing the use of viscid substances to hinder them from crawling up the stems.

The larvae, *Prepodes vittatus*, have also caused much damage by devouring the roots of the trees.

Sphenophorus sericus, *Diaprepes abbreviatus*, *Calandra Oryzae*, *Rhyncophorus Palmarum* and *Sphenophorus sordidus*, all common in the Antilles, have done less harm.

W. W. FROGGATT. **The Diamond backed Cabbage Moth (*Plutella cruciferarum*).** — *The Agricultural Gazette of New South Wales*, Vol. XXI, Part 10, Oct. 1910, pp. 894-899.

Australia

The caterpillar of this moth, known as *Cabbage Grub*, or *Cabbage-Worm*, has spread from Europe all over the world, and is well-known to the Australian cabbage grower and to consumers.

Curtis mentions it in his *Farm Insects* (1) under the name of Turnip Diamond-backed Moth, *Cerostoma xylosteum*, and says: "On the Continent it lives principally upon the upright honey-suckle (*Lonicera xylosteum*) and attacks a great number of culinary plants, but seems to prefer the cabbage and the turnip."

It was probably introduced into Australia from England, and may have come via Mauritius.

It does much harm at intervals in English turnip fields. The caterpillars must not be confused with the larvae of the *Cabbage Moth* (*Mamestra brassicae* Linn).

A plate is given illustrating the damage wrought by caterpillars of the Diamond-backed Cabbage Moth (*Plutella cruciferarum* Zeller) and the life history of the insect.

The source of all the insect and fungus pests of the cabbage seems to be the refuse of the crop often left in the ground to rot, or run to seed.

Most of the remedies suggested are useless for large areas, though more or less successful in small gardens.

The main thing is to plant healthy cabbages in uncontaminated soil, which must be kept free from infection. Kerosene emulsion preserves the plants from attack while young; boiling water kills the grubs; while dusting with lime and tobacco dust is a very efficacious remedy.

P. HERBERT and G. AUSSÉNAC. **Damage done by the Adult Dotted Pentodon.**—*Journal d'Agriculture pratique*. Paris, Nov. 27, 1910, N. 46, pp. 626-627.

The dotted Pentodon (*Pentodon punctatus*) is generally considered by entomologists as quite harmless in the adult stage, the larva only being known to damage vines. Messrs. Herbert and Aussenac, however, observed in the garden of the Practical School of La Réole (Gironde), that the adult pentodon gnaws lettuce roots. No other insects were attacking the plants at the time, and the pentodon was frequently found in the space that he had hollowed out in the root of the lettuce.

France

To verify the observation, a wire-net cage was placed over some lettuce plants and a pentodon put inside. Some pot cultures were also made, with sand absolutely free from any other insect, and a freshly gathered head of lettuce was placed in a glass jar with two pentodons. In all three cases, the roots were attacked by the coleoptera, so that *Pentodon punctatus* not only damages vines, but also attacks lettuce and chicory. The adult

(1) For further information on the Diamond backed Moth *cerostoma xylostella* (Curtis) see E. A. Ormerod's Manual of injurious Insects and methods of prevention. London 1890, pp. 192-194. [Ed.].

insect does not live exclusively on its own reserves, as hitherto believed, but feeds on the roots of certain plants.

W. V. TOWER. **Use of Hydrocyanic Acid Fumigations for destroying the White Fly, *Aleyrodes vaporarum* (West), Tomato and Cucumber Parasite in Massachusetts.** (Fumigation Dosing. I. Tomatoes. II. Cucumbers). — *Agricultural Experiment Station of the Massachusetts Agricultural College. Twenty Second Annual Report.*, pp. 214-217. Boston, 1910.

A very effectual remedy against the White Fly (*Aleyrodes vaporarum* West.), which does so much harm to tomatoes and cucumbers in Massachusetts, is to use hydrocyanic acid fumigations (given off by cyanide of potassium). Unfortunately, this process not only kills the butterflies but very frequently damages the plants.

A series of observations and investigations have been made at the Massachusetts Experiment Station, with the object of determining the quantity of cyanide to be used per cubic metre and the best conditions for making the fumigations. The following conclusions have been arrived at:

- 1) No applications should be made during the day, and especially in the sun, because they invariably kill or seriously injure the plant;
- 2) No good results are obtained by moonlight applications: dark and cloudy nights are the best;
- 3) The temperature is of no consequence, the applications giving the same results, whether it be hot or cold;
- 4) A very high degree (75° or more) of moisture generally has a rather unfavourable effect;
- 5) Small quantities of cyanide of potassium with long exposures are better than strong doses with short exposures.

To sum up, the best method of freeing plants from *White Fly*, is to make hydrocyanic acid fumigations by treating cyanide of potassium with hydrochloric acid; 0.15 gr. per cubic metre should be used. The exposure should last for about an hour, and should be made on a cloudy night, the conditions of moisture at the beginning of the operation being less than 70°.

G. LÜSTNER. **New Method for Controlling Cochylis.** (Ueber das Treiben der Sauerwurmpuppen). — *Weinbau und Weinhandel*. Mainz, November 19, 1910.

Germany M. Lüstner experimented, at Johannisberg on the Rhine, on the following method of controlling Cochylis: during winter, the vine-props were kept in warm rooms, to hasten the transformation of the chrysalids. The premises were heated to 60.8° — 64.4° F (16-18° C.), and 16 000 props were used for the experiment. After six weeks, two-thirds of the butterflies were out, the rest had dried up.

The total cost of this process was 124 marks per *Morgen*, or £7.19 s. 2 d. per acre (744 frs. per hectare) that is, 2 *pfennig*, about a farthing ($2\frac{1}{4}$ centimes) per prop. There are generally two or three chrysalids on each prop, so that the cost of destruction is 0.7 *pfennig* each, about three farthings which is nearly the amount paid for each larva gathered in summer.

The advantage of this method is that all the larvae are destroyed, whereas a good many escape the summer treatment. The vine stems must afterwards be well brushed, of course, in order that any chrysalids hidden on them may be destroyed.

CARSTENSEN-BACHARACH. Attempts to Destroy Cochyliis. (Ueber Versuche gegen den Heu- und Sauerwurm). — *Neue Deutsche Wein-Zeitung*, V Jh. N. 11; Mainz, Nov. 1, 1910.

Much interest was aroused at the beginning of this year by the results obtained by Messrs Capus and Feytaud, in France, by the use of a normal solution of nicotine added to Bordeaux Mixture against the Cochyliis. Similar experiments made in Germany, although the greatest care was used, have given anything but encouraging results, as may be seen from the following table:

Germany

Date of treatment	Solution used	Number of buds & worms			
		Treated with nicotine		Without treatment	
		Buds	Worms	Buds	Worms
May 26	1,3 %	200	300	220	350
May 26	1,5 %	250	260	190	210
June 4	1,3 %	180	160	246	270
June 4	1,5 %	197	171	198	200
		827	891	854	1030

Good results were obtained, on the contrary, by using Schweinfurt green mixed with lime and sulphur in the proportions of 10 kg. of lime and 5 kg. of sulphur to 1 kg. of Schweinfurt green.

The plants were dusted on June 25th, and a large proportion of the worms were already dead on July 3rd, while there was no case of necrosis of the leaf tissues.

H. NICOLAS. **Sulphide of Carbon against Pyralis and Cochylis.** — *Revue de Viticulture*. Paris, N. 884, Nov. 24, 1910, pp. 588-589.

France

M. Nicolas observed that at the time the vineyards were treated with sulphide of carbon against phylloxera, the *Pyralis* disappeared, and was not seen again for some years after the vineyards were replanted. He suspects a connection between the treatment of the soil with sulphide of carbon and the disappearance of the caterpillars, the vapours rising from the soil having destroyed the chrysalids hidden in the bark. It is probable that the *Cochylis* would be affected in the same way by these vapours.

The distribution, by special ploughs, of sulphide of carbon in the soil, towards March or April, should be efficacious against these caterpillars, by suffocating them as they come out.

As this treatment is inexpensive, and *might be* an efficacious and easy way of controlling these redoubtable enemies of the vine, it deserves to be studied.

Control of Grape Pests in Germany. (Zur Bekämpfung der Rebenschädlingen). — *Deutsche Wein Zeitung*. Mainz, Jahrgang 47, N. 87, Nov. 24, 1910, p. 808.

Germany

The District Council of Goarshausen, having been informed by the mayors of the various vine-growing centres, of the great decrease in the crops, has issued an order that every means is to be adopted to prevent the diffusion of cryptogamic diseases and the increase of insects to which this failure is chiefly due.

Chemical preparations have had no effect on the *Cochylis* and other insects. It is proposed to employ the children of the elementary schools, who under the guidance of grown up persons might be of great use.

The protection of birds is most urgently recommended, and extremely interesting information is given on the extraordinary quantity of eggs, larvae, and insects that some species of birds can destroy.

G. DALMASSO. **Control of the Grape Moth.** (La lotta contro le tignole dell'uva). — *Stazioni Sperimentali Agrarie Italiane*. Modena, 1910, volume XLIII, fasc. VII-IX, pp. 593-655.

Italy

Good results may be obtained by destroying chrysalids and reducing the number of their hiding places. This can only be done by using vine props of reinforced cement or iron, in place of wooden ones, wherever the system of cultivation permits. The only refuge then left for chrysalids will be the vine stocks, and if these are alternately stripped and painted with insecticides, the treatment will be really efficacious.

In any case, the very simple method known by the name of *refuge-snares* should also be employed; this consists in wrapping rags, paper, or straw round the vine stocks and props; the ends of canes, etc., which have served as trellises could also be used.

M. Dalmasso is of opinion that vine growers should make a habit of collecting the worm-eaten grapes in August; it is an extremely simple and efficacious method, and well worth the trouble that it involves.

Instead of destroying this collection at once (worm-eaten grapes, rags, etc., that have served as refuge traps, the terminal nodes of reeds, etc.), it might be placed in ordinary boxes with small gratings 2 mm. in diameter, whence the endophagae could escape in spring and return to the vines. This is an inexpensive system, and as it might be useful, in preventing the development of the moths, it is worth trying.

These are the precautions recommended by the writer, who has made a long series of investigations, especially with insecticides the practical effect of which is still uncertain.

L. CHAS. P. LOUNSBURY. *Calandra of the Vine in South Africa.* — *The Agricultural Journal of the Cape of Good Hope*, Vol. XXXVII, N. 4, pp. 480-450, Cape Town, Oct. 1910.

Phlyctinus callosus attacks the vineyards of South Africa from the Cape as far as the upper part of the valley of the Hex River. The larvae burrow under ground and feed on the principal roots, and in spring the adult insects devour the young shoots.

Arsenite of lead has given good results as a remedy.

Phylloxera in Austria. — *L'Agriculture commerciale*, Paris, Nov. 27, 1910.

At the end of 1909, the vines on 182 000 out of a total of 255 650 hectares under cultivation were affected with phylloxera; on 115 000 of these they were completely destroyed.

About 49 600 hectares have been restocked. The State encourages restocking in every way, and supplies vine growers with resistant stocks. In Lower Austria, in the autumn of 1909, 505 wine-growing Communes applied for 73 029 300 American stocks, of which the State was able, in the spring of 1910, to supply 23 millions; it had furnished 20 millions plants the previous spring.

South
African
Union:
Cape
Colony

Austria

- R. AVERNA-SACCÀ. **The Acidity of the Sap of American Vines in Relation to their Resistance to Phylloxera, according to Comes.** (L'acidità dei succhi nelle viti americane in rapporto alla resistenza di esse alla fillossera, secondo Comes). Estr. dagli Atti del R. Istituto di Incoraggiamento di Napoli). — *L'Agricoltore del Mezzogiorno*, No. 22, Nov. 15, 1910, p. 34.

Dr. Averna-Saccà's work is based on Prof. Comes' thesis that *the degree of acidity of the saps in the roots of American vines is in direct relation to the degree of their resistance to the attacks of Phylloxera*, and he has endeavoured to prove its truth by a number of chemical tests of the acidity of the buds, roots, fruit, etc., of American vines. He has arrived at the following conclusions:

"Every circumstance which tends to decrease the natural acidity of the vines must tend to weaken their resistance to Phylloxera.

Italy "And since, in the south, the warm, dry condition of the plains, the superabundance of lime in the soil, and the careful cultivation (especially with farmyard manure) tend to diminish the acidity of the plants, it is clear that in sunny wine-growing regions of the south, in calcareous soils and in vineyards where there is intense cultivation, the original resistance of the American vines to phylloxera is enfeebled by degrees, and with time the vines reconstituted on American stocks deteriorate more or less seriously."

The writer suggests the following rules for restocking southern vineyards in future:

- "1) The new nurseries and new vineyards should be planted exclusively on hill-sides, if longevity and resistance to phylloxera be desired;
- 2) Direct hybrid producers, should be used, obtained by crossing the best local stocks with pure or hybrid forms of the *Berlandieri* reproduced by seed and selected;
- 3) Vineyards destroyed by phylloxera should be restocked, only after cultivating the ground for several years in succession with herbaceous plants;
- 4) No grafting should be done, if the longevity of the vineyards to be planted or restocked be desired."

Increase of Phylloxera in the Department of Algiers in 1910. — *L'Agriculture commerciale*, Paris, Nov. 27, 1910.

France Phylloxera assumed new proportions in the Department of Algiers in 1910, 92 estates in 25 Communes being recognized as affected. There were 470 patches, with a total of 18 480 vines attacked.

The Governor General has issued an Order setting forth the conditions under which treatments are to be given and the methods to be followed in restocking in those parts of the Department where, on account of the ex-

tent of the disease, it is no longer possible to keep exclusively to the destruction of the affected plants. Those vine-growers' Syndicates which have applied, have been authorised to introduce plants for nurseries or planting new vineyards.

PIERRE LARUE. **Arsenical Treatment against the Urbec in the Yonne.** — *Revue de Viticulture*, N. 884. Paris, Nov. 24, 1910, p. 589.

The Bureau for the replanting of vineyards organised experiments in 1909, in districts affected by the Urbec(1) and excellent effects were obtained by spraying with a mixture of the following solutions:

France

Solution A:	anhydrous arseniate of soda . . .	200 gr.
	neutral acetate of lead	600 »
	water	50 lit.
Solution B:	copper sulphate	2 kg.
Bordeaux	quick lime	1 kg.
Mixture	water	59 lit.

There were from 10 to 15 Urbecs, on each vine before the treatment, which destroyed them all.

G. GAUDOT. **The Cheimatobia of the Apple Tree: Cheimatobia brumata.** — *Journal d'Agriculture pratique*. Paris, N. 44, Novembre 3, 1910, pp. 564-566.

The *Cheimatobia brumata* causes serious damage in the cider apple orchards in Normandy and Brittany. The female of this butterfly is wingless and lays its eggs at the end of autumn in cracks in branches. The caterpillars come out in spring and devour the buds and flowers. In order to prevent the female from climbing up to the branches to lay her eggs, a band of some viscous substance 20 or 25 cm. broad should be applied round the apple trunks. This substance should preserve its viscousness for about 2 months. A viscous compound of castor oil has given good results, but as it is soluble in water, it must be protected by a paper shade.

France:
Normandy
Brittany

(1) The Urbec is the *Rhynochites betuleti*, commonly called *attelabe* or *cigarier* in France, *sigararo punierolo* in Italy, and *Rebenstecher* in Germany. (Portes and Ruyssea, *Traité de la vigne et de ses produits*, t. III, Paris).

Other pests.

Destruction of Rodents and Protection of Birds. — *The Times*, Nov. 10, 1910, p. 4. London.

In consequence of some cases of bubonic plague at Preston Suffolk, last September, the authorities have organised a vigorous campaign for the destruction not only of rats, but also of other rodents, such as hares and rabbits. The farmers kill a number of rats and rabbits during the year, and the sale of rabbits in some degree repays them for the damage they do to their crops. But this year, general fear of infection prevents the public from buying wild rabbits.

Great
Britain:
Suffolk

Farmers are of opinion that if gamekeepers would leave the hawks, owls stoats and weasels alone, rodents could not multiply to such an extent.

A Special Committee of the Royal Institute of Public Health is to confer shortly with the President of the Board of Agriculture on the question of the destruction of rats and vermin, which are a menace to the public health and a pest to agriculture.

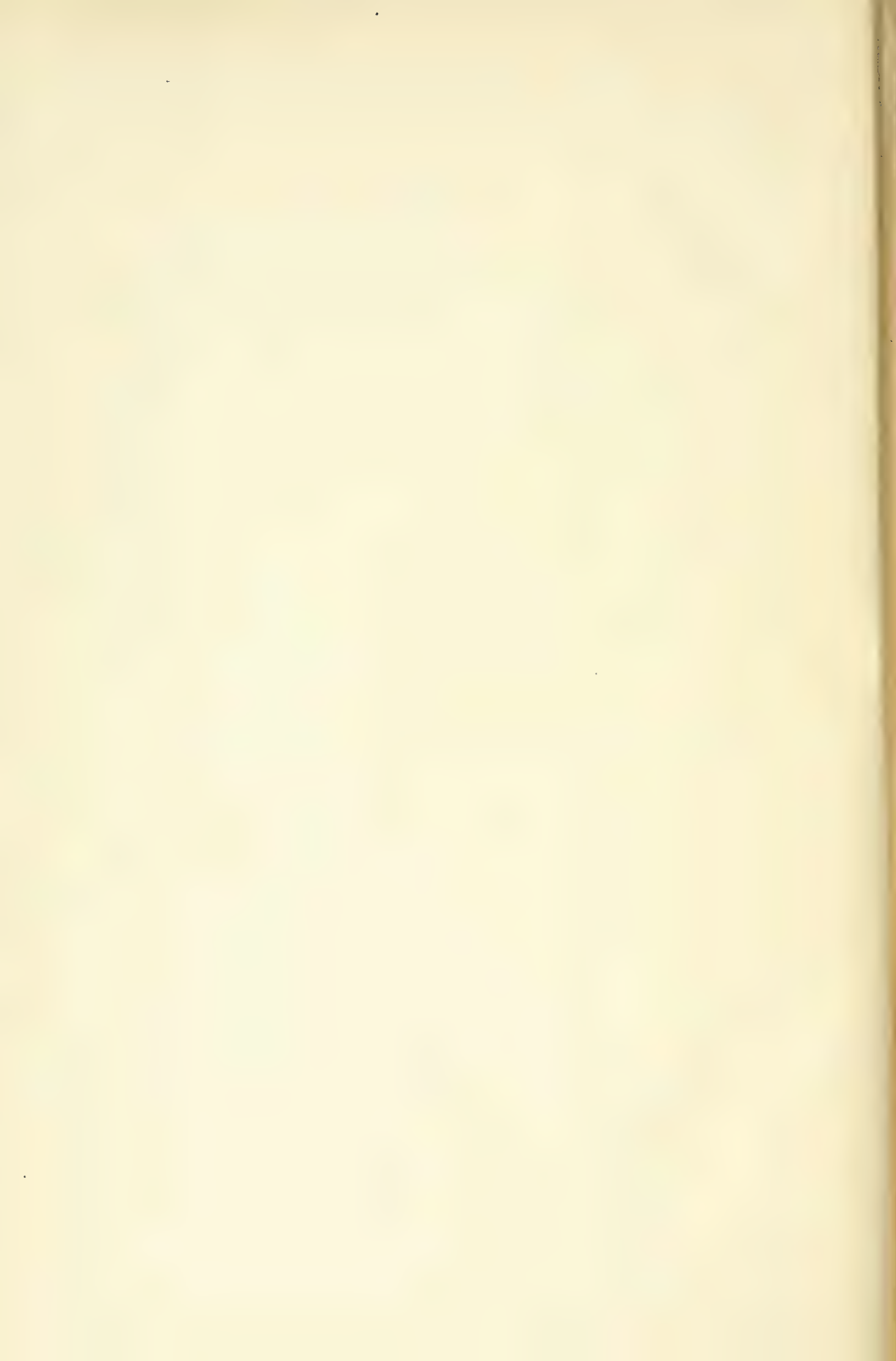
J. B. To keep Crows from Sown Lands. — *L'Agriculture pratique du Centre*. Blois, N. 45, Nov. 6, 1910, année 16, p. 708.

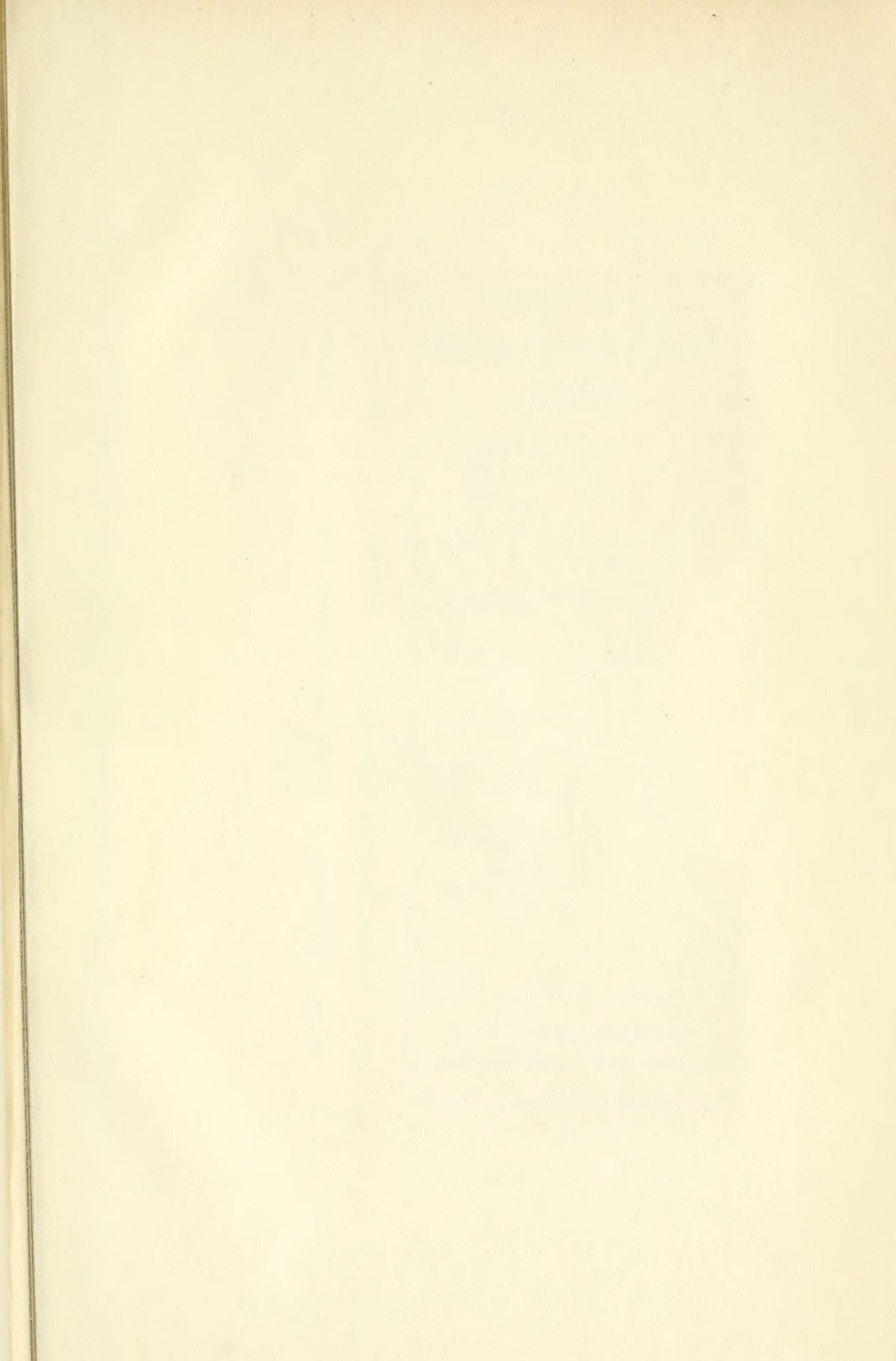
Every year in spring and autumn, when cereals are sown, crows swarm down upon the fields and sometimes ravage them completely. Great damage is done in this way, and many means have been tried for saving the corn. Among products which keep the birds off by their strong smell, is *chauline* which has given good results.

France

Stretching twine (that used in reaping and binding machines for instance), over the sown fields has been found very successful, and is simple and economical. A few hundred metres per hectare are sufficient: it should be fixed in zig-zags with wooden pegs at a height of 4 to 6 inches (10 cm. or 15 cm.) from the ground.

The crows, more suspicious than intelligent, suspect a snare and fly away.





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